VARIATIONS ON THE LOOPS: AN INVESTIGATION INTO THE USE OF DIGITAL TECHNOLOGY IN MUSIC EDUCATION IN SECONDARY SCHOOLS

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List of Abbreviations

CAI	Computer-aided instruction
CAL	Computer-aided learning
CAPNA	Curriculum and Pastoral Needs Assessments
ERO	Education Review Office
FIMT	Formal instrumental music tuition
GCSE	General Certificate of Secondary Education
IEP	Individual Educational Programme
ILP	Informal Learning Pedagogy
MENC	Music Educators National Conference
MKO	More Knowledgeable Other
NCEA	National Certificate of Educational Achievement
OFSTED	Office for Standards in Education
PA	Public Address
UNESCO	United Nations Educational, Scientific and Cultural Organisation
ZPD	Zone of Proximal Development

Abstract

This thesis examines how nine teachers in four New Zealand secondary schools are using digital technology in music education in order to gain a greater understanding of how it is used, why it is used and what constraints may exist that hinder implementation. This thesis contends that although there was evidence of considerable use of digital technology in the schools, particularly in composition activities, a range of factors are influencing the choices teachers are making as to how they are using it. Despite the potential digital technology may have to transform classroom activities in music education, usage, in most cases, remains fundamentally conservative and heavily informed by traditional Western art music practices.

A multi-site case study approach guided this investigation. Initial descriptive numerical data were gathered from teacher and student questionnaires. Further data came from the semi-structured interviews with teachers and small groups of students in each of the four cases. Findings from the data showed that although the teachers participating in the study had a range of digital technology available to them and they made use of it on a regular basis, a range of factors influenced the choices they made when using it in their classrooms.

Amongst this range of factors influencing the choices they made, the most important appeared to be the requirements of an external examination system that is remains informed by Western art music practices and in particular on the cognitive dimensions of analysis, harmony, music history, traditional aural skills and an understanding of music notation and theory. Even though there are specific references to a range of

styles and genres in the mandated national curriculum, Western art music practices remain most important to most of the teachers.

Findings from the student data showed that the students participating in this study appeared to have a high level of digital literacy and were able to use digital technology in both formal and informal learning situations. A number of the students also discussed and demonstrated their informal music learning skills in performance and composition activities. For these students, contemporary music practices are very important to them and if they do not receive the information they need at school they know how to access it using a range of digital devices in an informal learning environment. This thesis contends that to be a successful music educator in the 21st century, the ability to work with Western art music practices and contemporary music practices is becoming an increasingly important skill.

List of publications arising from the thesis

Wise, S. (2008). Using ICT in the Music Room: Possible Implications for Secondary Music Teacher Training. *New Zealand Journal of Research in Performing Arts and Education: Nga Mahi a Rehia, 1*(1).

Wise, S. (2009). The Impact of ICT in secondary music education. *Music Forum: Journal of the Music Council of Australia, 16*(1), 41-45.

Wise, S. (2010). Teacher and student perceptions of digital technology in secondary school music education: a case study. *e-journal of studies in Music Education, 9*(1), 46-60.

Wise, S., Greenwood, J., & Davis, N. (2011). Teachers' use of digital technology in secondary music education; perceptions and issues *British Journal of Music Education, 28*(2), 117 - 134.

Conference Presentations

Wise, S. (2008). *Using ICT in the Music Room: Possible implications for secondary music teacher training.* Paper presented at the Australian and New Zealand Association for Research in Music Education (ANZARME), Melbourne.

Wise, S. (2009a). *Case Study 1: School C.* Paper presented at the XXXIst ANZARME Annual Conference and 1st Conference of the Music Educators Research Centre (MERC), Akaroa.

Wise, S., Greenwood, J., & Davis, N. (2009b). *Nine teachers' perceptions of ICT in secondary music education.* Paper presented at the Music 09 (MENZA), Christchurch.

Wise, S. (2010). *Teachers' perceptions of the impact of ICT in secondary music education.* Paper presented at the 29th ISME World Conference on Music Education, Beijing, China.

Wise, S. (2011). *Students' perceptions of digital technology in Music Education*. Paper presented at the XXXIII ANZARME Annual Conference, Gold Coast, Queensland.

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Introduction

My initial motivation for undertaking this study was deeply influenced by an experience that took place when I was visiting a student music teacher on practicum. This student was working in a Decile[1] 2 school in the lower North Island. On this particular day, the class was taken to the computer room where the student teacher set up a composition activity requiring students in the class to use sequencing software utilising pre-recorded loops to replace the soundtrack to the opening of a well-known movie. While watching the students work, I was amazed at their level of interest and commitment to the task. I was very impressed with the way the students interacted with one another. If a particular student had a problem with some aspect of the task, usually an issue using the software, another student was able to provide the solution for him or her. They did not appear to need a great deal of teacher intervention to complete the task and were happy to share and critique each other's work at the end of the session. What really stood out was the way that one of the girls in the class seemed to know what to do without any help at all. If other members of the class were having problems, she was quick to offer suggestions and provide solutions for them. The associate teacher told me that this student was seen as a major troublemaker by other teachers when in other classes and was, in fact, due to be 'stood-down', a form of temporary suspension, from the school that very afternoon! He said that although she could engage in disruptive behaviour in more traditional music classes, she was

[1] A school's decile rating indicates the extent to which it draws its students from low socio-economic communities. Decile 1 schools are the 10% of schools with the highest proportion of students from low socio-economic communities, whereas decile 10 schools are the 10% of schools with the lowest proportion of these students.

always perfectly behaved in classes involving composition in the computer room and was often, as he described, ‘my right hand man’.

Sequencing software has been used from the late 1980s both in professional recording studios with contemporary music and in music classrooms in schools. This development was then followed by more sophisticated software that facilitated traditional music notation. Music teachers in schools were quick to see the possibilities that such software offered, particularly in the area of composition. Such resources soon become common in classrooms in New Zealand and internationally. However, this was the first time I had seen a music teacher using sequencing software that included a number of pre-recorded loops. Such loops typically provide repetitive drum patterns, bass patterns and progressions, electric guitar riffs, sound effects and a range of other patterns or repetitive melodic ideas played on a range of different instruments. The way that the students were able to manipulate these loops, arranging them and re-arranging them with ease, and the remarkably sophisticated work that they produced provided the catalyst for me to consider a study into the use of digital technology in general music classes, particularly in the junior (Year 9 and Year 10) classes in a school.

This thesis explores teachers and students’ perceptions of the use of digital technology in music education. For the purposes of this study, the term ‘perception’ refers to the attitudes, awareness and understanding that teachers and students have of digital technology and its use in music education. The thesis reports on a study of the experiences of nine secondary music teachers and a larger group of Year 9 and Year 10 students in four different secondary schools. The core objective of this study was to explore their perceptions of digital technology used in music education at junior high school level; thus contributing to a deeper understanding of how digital

technology is used in music education in schools and identifying any implications these perceptions may have for future music teacher education in initial teacher education programmes.

This thesis places the use of digital technology for composition and other related musical activities within a context of formal music education internationally and discusses how it has been in used in the context of music education in New Zealand. Related to this discussion is a brief examination of the adoption, adaptation and implementation of digital technology into education in general before focusing on how digital technology is being used in both formal and informal music education practices in and out of the classroom. A necessary part of this discussion is an examination of the impact of contemporary music in current music education practice in a variety of settings, as digital technology is strongly connected with contemporary music. I will focus on the context of the schools that the music educators and students described in each of the four case studies, which contributed to this larger study. I will examine how a range of internal and external factors is shaping their practices, again inside and outside the classroom. These factors include the requirements of the national curriculum, the expectations of school management, parents and the students themselves. Other important considerations include an underlying philosophy of music education, the beliefs the teachers have themselves about the effectiveness of digital technology in their teaching and their knowledge and understanding of the needs of the students that they teach. Initially, I explored the spread of current practice using a series of teacher and student questionnaires, which provided a range of descriptive numerical data. This data, which included information on personal use of digital technology, the current use of digital technology in the music classroom and some descriptive numerical data related to the perceived effectiveness of digital

technology, have informed and shaped the investigation of practice that formed the four case studies in which teacher and student perception of digital technology is subsequently interrogated in greater depth.

The overarching aim of this project was to develop a clear understanding of how teachers and students respond to digital technologies, which they use on a regular basis in a music classroom. Key to this understanding was the initial investigation into the use of technologies by teachers and students both at home and in their music classrooms. Following that, factors that may enhance or inhibit music education using such technologies were explored. These findings were examined and compared to contemporary theories related to music education, teacher use of information and communications technology, and formal and informal learning in music. Finally, as a result of this investigation, the findings are discussed and these could be used to inform current knowledge surrounding content and pedagogy in courses for music specialists in initial teacher education. These findings could be used to help beginning music educators utilise current and new technologies in a way that aids the development of critical thought regarding the choice of approaches they may take with junior students in general music classes, in order to enhance practice and outcomes. Beginning and experienced teachers could also use the findings to inform their choice of suitable digital resources for use in the classroom. Connected to this is the implementation of appropriate pedagogical processes informed by the use of digital technology by these teachers for their students.

My Experience with Digital Technology

As a child born in the late 1950s and a secondary school music teacher working in the 1980s and the 1990s, I lived through the introduction of computers and a range of digital technologies in schools, in its various forms. Computers did not

exist in my primary schools. They did exist during my secondary schooling but were, largely, big mainframe devices located in specialised computing companies or at a few, very lucky schools. We were taught basic computing code as part of our maths classes and this code was transferred to punch cards. A volunteer took these cards to a technology company where they disappeared and a day later, the print out from the machine was available for each student in the class. We were able to see the results but never the machine from which they came. As part of my undergraduate degree at university, I prepared a series of algorithms, which were converted by a computer programmer into suitable code to generate random tone rows as part of a project in advanced electronic music composition. This time, I was able to meet the person who wrote the code and to see the machine that generated my results, but I had no direct connection with it. Once again, I felt disconnected from the process and the machine that produced the results for me.

The development of the microprocessor in the early 1970s resulted in microcomputers becoming far more affordable and they were introduced into schools in many Western countries at a rapid rate. By the time I began teaching in the early 1980s, computers were appearing in schools in New Zealand. My first experience with software designed to support music education came through an early Apple computer. This software was designed to help students develop their aural skills and was of 'drill and practise' design. The design of tasks such as these placed emphasis on repetition where the user had a series of similar tasks to complete. If they did not complete a series of tasks successfully, they would have to repeat the series again until they could demonstrate mastery of the task. Early software was designed so students could identify intervals between two notes, indicate incorrect notes in melodies that were represented on the screen and re-play rhythm patterns via keys on

the computer keyboard. After working through numerous series of tasks that increased in difficulty, the intended result was greater facility in identifying intervals, rhythm patterns and the like. In practice, the repetitive nature of the task regularly bored the students.

My experience teaching in Great Britain also exposed me to a greater level of technology use in music education than I had seen previously in New Zealand. In 1987, I began work as a teacher of music at a secondary modern school in Buckinghamshire. At this school, the chief resource in the music department was a class set of keyboards that the students played on a regular basis. Having owned two synthesisers when playing in various rock bands, I was familiar with how these instruments might be used in the classroom. However, what surprised me was how many of the students in the class had experienced little or no formal music education but were very competent players. It transpired very quickly that these students had been encouraged to use their aural skills to work out melodies and chords for the popular songs they wanted to play. My own aural skills had been developed in a similar manner when playing in rock bands where other members were unable to read music or chord charts but could quickly work out the harmonic structure of a song just by listening to it a few times and playing along with the recording.

My arrival at the school coincided with the introduction of the General Certificate of Secondary Education (GCSE) qualification. The requirements for music in GCSE were quite different to anything I had encountered in external music examinations in New Zealand and I was very excited to see the recognition of students' performance and composition skills in a formal external qualification. It was immediately obvious to me that the students could probably reach the requirements for the performance and composition components of GCSE music, but would struggle

with the more formal and theoretical requirements when it came to being able to complete the aural and music theory components of the course. As a result, the approach I adopted was a far more experiential approach than I had used previously. The students first learnt to play a particular piece and once they were very familiar with it. I then explored the relevant theoretical concepts connected with the piece. From there, the students often progressed to working on an individual composition, incorporating some the theoretical concepts discussed in class after they had learnt a new piece.

Context for the Study

The current situation surrounding music education is one of increasing complexity and tensions. A range of challenges face music educators in all sectors, as it appears that an array of opposing forces are pulling teachers and students in different directions. Challenges to music education informed by so-called Western art music traditions are coming from a number of areas; the increased use of contemporary music in a range of contexts, the increasingly sophisticated use of a range of digital technologies, again in a range of contexts, and the contested nature of recent curriculum developments. Most recent international curriculum developments have embedded music education as part of a wider, more integrated arts curriculum, which includes dance and drama. Prior to these developments, music and traditional visual art education enjoyed a privileged position as, usually, the sole arts courses taught within a secondary school. Key to this situation of increasing complexity appears to be a growing tension between the growth of music education informed by a range of informal approaches using contemporary music, supported by digital technology aiding the accompanying traditions of creativity, and the requirements of a national school qualification system achievement in which music appears to be

measured by a framework informed by skills coming from the Western art music tradition.

The development and proliferation of digital technology in the music classroom has been particularly rapid over the last decade and its presence, as Pitts and Kwami (2002) predicted, has had major implications for music educators. Teachers and students now are able to access a wide range of sophisticated equipment and software suitable for students at all levels in the school system. The following developments, each discussed further in the literature review that follows, are particularly relevant for this study:

- Modern electronic keyboards and computers loaded with suitable software are able to generate a range of sounds very similar to those found in the performance and recordings of contemporary music. Activities in the music classroom can be related to the world outside. Students can now create music using equipment that allows them manipulate sound in a variety of ways and, most importantly, allows them to create music that they may not be able to physically play (Crow, 2006).
- Students at secondary school have often been exposed to technology that allows them to create their own music at previous schools or home. As a result, it has been reported, anecdotally, that they have become increasingly alienated by what they are offered in traditional school music courses that, in many cases, remain heavily influenced by Western art music practices and traditions (Cain, 2004; Lamont, 2002).
- Informal music practices such as those identified by Green (2001, 2002, 2006, 2008) are becoming increasingly recognised as a way of re-connecting with students that may have become disenchanted or alienated

by their experiences in general music classes in schools. One of the activities often associated with informal practices is song writing, and digital technology is an essential tool that allows students to create sophisticated compositions without having to rely on traditional music notation to create their work.

- Many secondary school music teachers are products of the Western classical tradition and may not be comfortable with the contexts, genres and styles in which their students wish to work and would appear to prefer. Some may have difficulty in accepting the need to utilise technology in their classroom; others may welcome its introduction and use but struggle to operate in a new environment that is foreign to their experience. This can affect both course material and the method of delivery to the students (Hargreaves & Marshall, 2003; York, 2001).

Research Questions

As a teacher and musician, I was interested in the way the music teachers and students might respond to a national curriculum that refers to Music as Music–Sound Arts (Ministry of Education, 2007). This title, by implication, places a new focus on the creation of sound using a range of technologies and, in particular, digital technologies. Based on my experience of working with music teachers in professional development courses, I have found many teachers have often been quick to respond to new technological developments and to try to include these in their classroom practice. In the last three years, I have been invited by three local schools to conduct an external review of their music departments. While conducting these reviews, I found the teachers, in some cases, had a considerable range of digital technologies available for use in their classrooms. However, despite having the equipment

available, it seemed they were reluctant to explore new possibilities and affordances that such technology may provide, preferring instead to do the same things in the classroom that they have always done.

The research focused on these key questions:

1. How do teachers and students in music classes use digital technologies and what are their perceptions of this use?
2. What role, if any, does the teacher have in a *digital* world that accustoms students to have a high level of control over actions and procedures and where music-making technology is already interactive in this way?
3. How are teachers changing their pedagogical approaches to meet the needs of students who, in some cases, may be more familiar and skilled with digital technology than their teachers?

Purpose of the Study

This study focuses on the use of digital technology in music education in four secondary schools. It explores the perceptions of this technology by nine teachers and a group of junior students in both performance and general music classes. The study aims to:

- explore and understand how teachers and students use digital technology both in and out of the classroom
- identify the processes, activities, elements and attributes that are common when teachers and students are using digital technology
- contribute to the growing body of knowledge about how teachers and students are using digital technology
- examine possible implications this may have for the development of new theories that may inform new pedagogical approaches designed to

maximise affordances and opportunities such technologies may provide in the classroom.

The purpose of the research is to develop a greater understanding how teachers and students perceive the use digital technology both in and out of the music classroom.

Significance of the Study

This research contributes to knowledge about how teachers and students use digital technology in music education in secondary schools. The use of digital technology, forming part of the resources used to support learning in a music classroom, is today accepted in a number of countries around the world such as the United States (US), United Kingdom (UK), New Zealand and Hong Kong, and is considered a necessary and desirable part of the teaching and learning environment (Beckstead, 2001; Edwards, 2005; Ho, 2004; Mills & Murray, 2000). These countries have spent considerable time and money implementing this technology in music education. Implementation has been accompanied by research into how this form of technology is being used in music lessons and how effective that use is in respect of students' learning about and appreciation of music (Button, 2006; Crow, 2006; Edwards, 2005; Hargreaves, Marshall & North, 2003; Ho, 2004; Kwami, 2001; Mills & Murray, 2000; Pitts & Westerlund, 2006; Savage, 2007). We know that technology is deeply embedded in the contemporary lexicon of many young people's musical lives and that the internet is their playground. Just how these factors are informing choices that young people are making about learning music, understanding music and how they are using a range of digital technologies is important if music educators are going to remain relevant to them. Young people tend to have familiarised themselves with ICT innovations before their parents and teachers have; a reversal of the usual

hierarchical roles. Various commentators (e.g., Jonassen, Howland, Moore & Marra, 2003; Prensky, 2001, 2009; Tapscott, 1999) stress that the students attending our twenty-first century schools are products of the digital age in that they have spent their lives surrounded by and using computers, videogames, digital music players, mobile phones and all the other tools and paraphernalia of what is also called the information age. Students of today do not know a world without the digital technologies associated with music making and listening—among them computers, electronic keyboards, MP3 files and players, compact discs, the internet, and a range of other digital music devices and formats (Webster, 2002a). A particular challenge that technology brings music teachers is that of finding ways to bring into the school setting the knowledge that students develop outside of school about digital music composition and production. A subsidiary challenge is that of moving technology from its position as an 'add on' in the music curriculum to a position of being embedded within the curriculum.

Although many of the challenges described above are appreciated by teachers; and it is known that many of today's secondary school students are high-end users or consumers of music technology, there is little evidence about what their music teachers know about technology in relation to their practice, how they deploy, or might deploy, this knowledge in the classroom, and what they learn from doing so. Burnard (2007) suggests that a universal aspiration for all music educators is to improve the quality of musical learning and its relevance to the young learner. With this in mind, she suggests that we need to consider carefully if a music teacher's capacity to use technology effectively matches the educational needs of his or her students. In today's ICT-driven world, music teachers are under pressure to accept

that they do not know everything and that they are not the holders of all musical knowledge (Green, 2008).

From a theoretical perspective, this research contributes further insight into teacher adoption and use of digital technology. The examination of adoption and use of digital technology in this study is informed by socio-cultural theory, which clarifies that processes of change in schools and classrooms cannot be understood in isolation because of the influence of regulatory frameworks and policies of national education systems and national cultures.

From a practical perspective, this research contributes to the field of professional development for existing music teachers and initial teacher education for beginning music teachers. By examining the perceptions of both teachers and students, the aim is to identify any tensions that exist for teachers when using digital technology, any gaps in understanding between the two groups and thus enhance the congruence between what teachers can offer and what students need, when working with digital technology in music education.

Scope of Research

The study was designed to investigate the use of digital technology by teachers and students in music education in four case studies located in four New Zealand secondary schools in one city. It does not claim to be generalised to other schools in the country. However, it is intended that an exploration of the practices surrounding the use of digital technology in these schools will raise questions and possibilities that are connected to all New Zealand secondary music classrooms.

It is important to acknowledge my position as an *insider* involved in the preparation of beginning teachers for music education in secondary schools. As such, I am in a privileged position and am known to many of the participants in the study

both as an experienced music educator myself, and as a leader within the larger qualification in which the beginning teachers enrol. It was critical that the study was clearly focused on gaining insight into teachers and students' perceptions of digital technology in music education. The study was not an evaluation of courses or teaching approaches at each school. Similarly, the study did not seek to evaluate the effectiveness of the music programmes offered at each of the schools involved in the study.

While it may not be possible to generalise from the detailed findings of this study, with caution it may be appropriate to interpret and apply the overall study to different contexts. It is anticipated, for example, that the findings of this study will be of value to teachers and other educators in tertiary institutions when examining the processes involved in implementation and application of digital technology in music education in the classroom. It may also be useful for policy makers and other interested parties who may be looking at further curriculum developments or changes to external examination requirements in light of any relevant findings in this project.

Structure of Thesis

This chapter has introduced the catalysts and context for the study, explained the purpose of the research, and stated the research question. It is important to locate this study in the context of both historical and more recent practices in music education both in New Zealand and internationally. The decision to do this came about as I considered how to best to tell the stories of each of the four case studies As a result, I have chosen to present the findings of this study in the following fashion.

Chapter 1 provides a brief overview of the history of music education both nationally and internationally. It begins by briefly describing some of the origins of formal music education prior to the twentieth century before describing the

development of music education in schools in New Zealand. Next is a discussion some of the trends of music education in the twenty-first century with a focus on new trends within the classroom. This chapter concludes with a discussion about the increasing awareness and inclusion of popular music in school music education and how many music educators appear to be changing their practice as a result.

Chapter 2 focuses on the adoption of new technologies by teachers. It begins by examining some of the different theoretical frameworks on which teachers base their teaching and learning activities. This is followed by an examination of some of the ways teachers are able to work in the 'digital age' in which many now operate and compare some of the old ways with the new ways of teaching that are possible due to the technology available. Finally, some of the pedagogical approaches teachers are taking when using some of this new technology are discussed.

Chapter 3 presents the key literature relating to the impact new technologies has had on music education. The focus is on the impact of digital technologies in the first 10 years of the twenty-first century before looking in more depth at the impact popular music is having on music education in a number of countries. I conclude this chapter by discussing relevant literature that examines the effect digital technologies may be having on composition.

In Chapter 4, the research methodology and design are described and justified. This includes the research design, ethical considerations and participant selection along with the sources, collection, analysis and presentation of data.

Chapter 5 contains a summary of the initial numerical data gathered via the teacher and student questionnaires, which subsequently informed the deeper investigations in the case studies.

Chapters 6, 7, 8 and 9 are the individual case studies describing the four schools involved in the study. In each case, a range of emerging issues arising from interrogating the data are identified and discussed.

Chapter 10 summarises the findings and discusses the technological, socio-cultural and pedagogical implications for future music educators surrounding the ongoing use of a range of digital technologies in the music classroom.

Chapter 11 is the conclusion of this thesis. Findings related to the initial research questions are presented. Contributions to knowledge, suggestions for further research, implications for policy and practice and specific implications for beginning teacher music education are discussed.

Chapter 1: Overview of Past and Current Music Education Practices

> I've learned everything I know of off records. Being able to play something immediately without all that terrible stricture of written music, the prison of those bars, those five lines.
>
> I forgot to mention that to play the blues was like a jailbreak.
> Out of those meticulous bars with the notes crammed in like prisoners, like sad faces. (Richards, 2010)

1.1 Introduction

Before beginning an exploration of the use of technology in music education in schools, it is necessary for the researcher to describe some of the historical developments in music education as well as some of the more recent developments that have occurred over the latter part of the twentieth century and the early part of the twenty-first century. This initial exploration will be reasonably brief, as it is not within the scope of this thesis to delve deeply into historical practices, but rather to focus on some of the relevant theoretical underpinnings that have influenced music educators in both historical and more recent times.

This chapter is divided into four sections. The first section will describe some of the important historical developments in music education. The second section is a brief review of the development of music education in New Zealand. The third section examines some of the trends in music education in the twenty-first century as described in the literature. The fourth section examines current practices and will review relevant literature connected to the development of these practices.

1.1.1 Background.

Music education throughout European history can be seen to take two forms: learning to make music and learning about music. Learning to make music was often

associated with community music activities where learning to play ‘folk’ instruments took place in an informal manner, usually taught by ear in conjunction with a more experienced practitioner. Learning about music has always been part of formal education. The wider context for these activities is provided by the role of music within the specific community. Where there is a priesthood, or a formal education system, both based upon writing and record keeping, a music develops that is notated and that is learnt within the formal situation. Thus, in the Middle Ages, one way to learn music was to be brought into the formal system of a church choir; at the same time, scholars being more widely educated learnt *about* music as part of the quadrivium. Early descriptions of music education in institutions points to an almost exclusive emphasis on performance, and in particular on singing (McPherson & Gabrielsson, 2002). The church naturally provided practical music tuition because music was an essential part of worship.

1.1.2 Historical overview of teaching practice.

During the Renaissance, royal courts began to break away from the domination of the church and began to include secular music. As a result, it became necessary to provide music-making tuition within the context of the court. Learning to make music in a formal situation now moved beyond learning to sing, or to play the organ and began to include learning to play instruments. This occurred in parallel with the development of those instruments from a local or community base into a more sophisticated court music (e.g., fiddles to violins) (Drummond, 2010).

During the eighteenth century, learning to make music was largely provided still in the church context where the local organist and choirmaster taught children to sing, provided some keyboard tuition and sometimes might teach some instruments too. By this time, music notation, which was first developed around 1000 AD by the

Benedictine monk, Guido d'Arezzo to teach singing using visual aids to represent differences in pitch, was now commonplace so learning to play music meant learning to read music, which in turn meant learning about music (Drummond, 2010).

Until the mid-nineteenth century, learning musical instruments was regarded as a craft and skills were handed down from one generation to the next, often through the form of a musical apprenticeship. During this time, composers and teachers did not separate technical practice from all round musicianship skills; the goal was to develop technique along with all round musicianship (McPherson & Gabrielsson, 2002).

Scales and arpeggios served as a way of learning common musical language and if small sections of a piece were played in isolation from the larger composition, it was for developing a range of musical skills such as sight reading, improvisation and composition. For beginners, these smaller sections were often learnt by ear rather than from traditional musical notation. As their skills developed, teachers would encourage students to invent their own small sections based on what they had learnt; in order to develop the expressive and technical skills needed to master the musical language of the repertoire being learnt (McPherson & Gabrielsson, 2002). Improvisation was an important part of being a musician.

During the nineteenth century, as result of the eighteenth-century Enlightenment, education was a privilege extended to more and more people. The advent of printed music, and public concerts and recitals, together with the growing desire of the bourgeoisie to participate in upper class culture led to an explosion in music making in the 'official' music of European culture referred to as Western art music. To meet the demand, more instruments were made, in particular, pianos; more

domestic music was composed and printed and more practicing musicians became teachers.

Rapid changes took place from around 1850 onwards. The development of the lithograph and high-speed printing machines meant that it was possible to mass-produce relatively cheap scores in large quantities. With this access to new printed material, the emphasis went from the development of skills in improvisation and composition to music as a reproductive art, with the emphasis on technique and interpretation. Pianists in particular began to practice for long periods to develop a particular technical skill that was often not applied when performing the musical literature. One unfortunate consequence was that exercises were often repeated endlessly during practice (Bowman, 2004).

McPherson and Gabrielsson (2002) describe how this approach moved from solely piano instruction to instruction for learning other instruments and, as result, 'method' books were developed with that emphasised drills and technical material such as scales, rhythms, articulations and finger exercises. Such exercises contained little or no material with melodic interest. One of the most common trends was to organise beginning method books according to the proportionality of the note values where the students were first taught whole notes, half notes and then quarter notes and so on. In essence, they argue, most modern method books tend to reinforce the notion of performance as a specialist craft in which technical development and the knowledge of notation are valued above all else. Many instrumental teachers still use such an approach and the 'method' books can be seen in many schools, particularly in North America (Bowman, 2004).

1.1.3 Playing by ear as preparation for musical literacy.

Although many recent authors describe playing by ear as one of the key factors in informal music education (Button, 2006; Folkestad, 2006; Green, 2001, 2006, 2008; Sloboda, 2001), Mainwaring (1941) was among the first researchers to study how people developed skills to play by ear. He questioned the then current teaching practice of teaching via traditional notation and suggested that it placed too much emphasis on technical skills and mechanised recall of music from the score. He suggested that learning an instrument should proceed from 'sound to symbol', based on his belief that the development of musical literacy should involve processes similar to learning to speak and then read a language. Mainwaring believed that the most musical way of teaching an instrument was to link sound with action continually. As such, in the beginning stages, this means encouraging students to reproduce simple known tunes by ear, before they learnt to read these songs from musical notation. His ideas can be contrasted with teaching that introduces basic notation from the earliest lessons.

Sloboda (1978) argues that no one would consider teaching a child to read while he or she was learning to speak but it seems the norm to teach a child to read music at the very first lesson. Literacy experts suggest that children typically possess a solid understanding of their own language before entering school. They are able to perceive and use an extensive vocabulary of around 5,000 words and are able to begin the process of learning to associate familiar words with symbols used to represent them. By sounding out letters, spelling patterns and words, children develop the skills to comprehend complex sentences. If these processes were duplicated in music, the process would involve teaching children to perform familiar tunes by ear before they learn to sound out tunes they already know via notation (Sloboda, 1978).

Shin'ichi Suzuki developed such an approach in the mid-twentieth century. Suzuki had observed that young children, preschool aged, were able to pick up language skills very quickly. He reasoned that if they were able to become so proficient in their 'mother tongue' perhaps if they were encouraged to play simple pieces on scaled-down instruments, then they would be able to become proficient performers at an early age.

1.1.4 Developments in the twentieth century.

Before describing music in education in the twentieth century, it is important to consider modern democratic education through the theories and influence of Dewey (Thwaites, 2008). Dewey cautioned against the arts being removed from their contextual source and becoming just objects to be admired from a distance. He states:

> When artistic objects are separated from both conditions of origin and operation in experience, a wall is built around them that renders almost opaque their general significance, with which aesthetic theory deals. Art is remitted to a separate realm, where it is cut off from that association with the materials and aims of every other form of human effort, undergoing, and achievement. (Dewey 1934/1997, p. 210)

Wisdom and desire are parts of Dewey's philosophy and the realisation of individuality forms part of this thought. Thwaites (2008) argues that Dewey sees the authentic self as one who is open to possibilities, their existence contingent on socio-historical constructions, but with potential and possibilities of their own. We are, Thwaites (2008) suggests, embedded in our own environment, which we must manipulate, adapt and control in order to become authentic-in-the-world. Dewey's influence on music education was not aimed at the gifted or the musicians of the future, but rather is framed in simple democratic terms so all children's musical

abilities can be developed in order for them to make cultural use of their leisure time (Thwaites, 2008).

Abbs (2003) suggests that between 1920 and 1980, the way the arts in the UK were taught was influenced by the shaping powers of progressivism and modernism. Key to this fusion was the influence of Herbert Read in his book *Education through Art*. The Board of Education (1931) report on music education in Britain at that time suggested 'that the curriculum is to be thought in terms of activity and experience rather than of knowledge to be acquired and facts to be stored' (Metcalfe, 1987p.97). Emerging in the 1920s and continuing until the 1970s, the traditional arts paradigm elevated the teacher to being responsible for releasing a child's creativity and self-expression. Unfortunately, many of the arts examples that children were likely to meet tended to reflect the adult world of long books, dense language and 'the master works' of Western art music (Abbs, 2003).

From the beginning of the post-war period through to the 1970s, it may be argued that music education stagnated. During that time, music education often consisted of singing, learning music theory and perhaps participating in some instrumental instruction on instruments such a the recorder or those found in either a pipe, or brass band. Through the 1960s, it became apparent that although music was being so enthusiastically engaged with by teenagers out of school, the School Council Report 1968 had music at the top of the list of the most boring subjects in school in the UK as ranked by 15 year olds (Metcalfe, 1987).

Since 1980, subjects have been taught within a new paradigm based on different premises, practices and expectations. The term 'paradigm' refers to the pattern of inter-locking categories and assumptions that makes sense of the world, or portions of it, in particular ways. This new paradigm, according to Abbs (2003), has

largely ignored the principles of creative pedagogy and holistic vision. Such a paradigm shift, for example, saw the use of the term ‘aesthetic’ move from meaning the discernment of taste and the ‘beautiful’ to ways of questioning assumptions about the arts and testing their truthfulness (Thwaites, 2008).

Other methodologies from the early part of the twentieth century such as the work of Orff and Kodaly continued to reinforce motor skills and musical literacy. The methods were linked to educational methods that adapted instruction to children’s developmental stages. Composition was seen as far beyond the capabilities of public school children as they did not have the necessary skills in one or more instruments and a mastery of Western music notation (Beckstead, 2001). However, at the mid-point of the century, a real change occurred. While most music education consisted entirely of developing motor skills on European instruments and encouraging a form of literacy based on the ‘classical masters’, the Western forms of music, both popular and art, were undergoing a revolution. Technological changes provided Western art music composers the opportunity to move beyond the traditional sounds and tonal systems associated with compositions up to that time and popular music, such as blues, jazz and rock was awakening a new generation of devotees (Beckstead, 2001).

The ‘official’ music (Western art music and its offshoots) began to be replaced in the culture by other forms of music, which were more playable by unskilled musicians. Technology altered the way music was accessed, which meant it altered the way tastes in music was formed. As a response, music educators began to argue for more practical music making in schools and the inclusion of music other than the ‘official’ music. These proposals, based in the real world, unfortunately hit a serious problem: the epistemology underpinning them is at odds with the epistemology of formal Western education (Drummond, 2010).

An alternate development in music education in the early decades of last century was the 'appreciation movement'. The roots of this movement come from both the UK and the US in the 1880s when it was suggested that music should be popularised. This movement sought to enable children in state schools to gain access to 'great' music through gramophone records and radio broadcasts and to develop their musical discrimination by seeking pleasure in listening with growing understanding of the artist and the nature of their work (Durrant & Welch, 1995).

The development of music education as aesthetic education was characterised by the view that music had a deeper value and can be viewed as 'an art so powerful in human experience and rich in human meaning as to be at the core of all that is good about life and that which must be shared through education' (Reimer, 1989a p.22). Reimer's (1970) earlier significant publication *A Philosophy of Music Education* asserted that music education must be aesthetic education. The challenge for music educators, Reimer argues, is that such lofty ideals lack specificity and it would be very challenging to teach music in such a manner as to derive its civilising benefits. Reimer (1970) suggests a way forward by viewing music education as aesthetic education via insights developed from complementary disciplines such as psychology, sociology and philosophy. By being informed by these disciplines, music educators develop a philosophy based on two key principles (Reimer, 1989b). The first is that 'aesthetic educators must be acquainted with the deepest values of music as they are understood by the professional scholars whose business it is to explain them' (p. 28). The second is that educators must do all they can 'to represent the art of music to children as authentically and comprehensively as our understandings of music and our teaching expertise allow' (p. 28). In summary, Reimer (1989) proposes that aesthetic

education should be based on an attitude that truth consists of a growing and changing conjunction of carefully examined ideas about what music is and does.

1.1.5 Practical music making and 'authenticity'.

In response to the development of an aesthetic education approach, other writers argued that past music education philosophy is remarkably weak in that it neglects to consider the nature and importance of music making (Elliott, 1995, 2001; Swanwick, 1997). Elliott argues that many of the educational pronouncements coming from music educators located in the 'music education is aesthetic education' position have failed to articulate critically reasoned positions on musical performing, improvising, composing, arranging and conducting; on the relationships between music making and music listening; and on the nature of musical creativity. Elliott (1995, 2001) suggests that to develop creativity you need to engage students in authentic musical problems and projects, and they also need opportunities to develop their creative skills in a receptive environment that encourages risk taking and the constructive evaluation of their creative work. As a part of this process, students should be encouraged to find their own music to perform, arrange and react to so they have a high level of ownership of the material with which they are interacting. This requires a suitable time allocation and, Elliott (1995) argues, teachers should work in a music teacher-as-coach model rather than in the more traditional teacher-knows-best position.

Swanwick (1999) believes that music education is not problematic until it surfaces in schools in a formal sense. When learning at home, he suggests, there is no requirement to 'form a curriculum committee and develop learning outcomes' (p.32) if an individual wishes to strum a guitar, sing in a choir or perform in a group. Much music education takes place in an informal setting where students may learn guitar

riffs from recordings or ask a friend about the fingering necessary to play a particular song. He says that for many students, the contribution of educational institutions to their music education could well be negligible or even negative. This is because unlike most, if not all other school subjects, in music there are many desirable and easily accessed alternatives. He says that music is easily accessed from anywhere on earth and students have access to high levels of music-specific information technology that can compete directly with conventional school activities (Swanwick, 1999).

'Authenticity' is a term that is used often when describing a range of music including contemporary, world and Western classical. The term is often used with considerable conviction but in many contexts the application of the term can be ambiguous or even contradictory (Schippers, 2006). For the purposes of this discussion, authenticity refers to an attempt at aiming at vitality of expression, meaning, and the essence of a musical style (Schippers, 2006). For Swanwick (1999), this issue of authenticity was at the heart of the problem of secondary students becoming progressively disenchanted with music in schools. He suggests that many secondary teachers found themselves veering between their own specialism, which students may or may not value, and an insecure 'generalism' in popular music and its wide range of styles and genres. Music, he argues, is an entity that is not easily reduced to work in a conventional classroom but rather is a multiplicity of activities all requiring some specialist know-how and often varying in group size and equipment requirements. Teachers' attempts at including contemporary music in their practices were not viewed as being authentic by their students. Swanwick (1999) questions whether it is possible for one teacher, when faced with such wide musical diversity, to be able to provide all the necessary requirements in each style and genre

for an authentic experience to be had by the students. To many young people, school music appears as a sub-culture separated from music out there in the world.

1.2 Music Education in New Zealand Schools

1.2.1 Historical practices.

Music in New Zealand schools in the form of singing had been a compulsory subject since the establishment of the Education Act in 1877. Between 1877 and 1920, four music syllabi were published, each one more complex than its predecessor (Braatvedt, 2003). During the 1920s, a number of overseas visitors involved in school music were very critical of the musical activities they saw in schools and pointed to a disparity between achievements in school music in other countries compared to what was happening in New Zealand. The result of this criticism was that the Minister of Education, C. J. Parr, made a specific comment about the standard of training in singing in New Zealand schools leaving much to be desired.

The burden on classroom teachers with little or no specialist music training or skills was high. A plea from the Society of Professional Musicians for a Supervisor of School Music resulted in the appointment in 1926 of E. Douglas Tayler, New Zealand's first Supervisor of School Music (Braatvedt, 2003). The subsequent appointment of four British music educators at the four Teachers' Training Colleges also augured well for school music with Hollinrake and Griffiths taking up positions in Auckland and Christchurch respectively in 1927 and Jenner and Clitheroe in Wellington and Dunedin in 1928.

1.2.2 E. Douglas Tayler.

In 1927, the Education Department of New Zealand published a book entitled *A Complete Scheme of School Music Related to Human Life* written by E. Douglas

Tayler. This book provided a detailed syllabus of instruction from early primary through to high school in New Zealand schools.

The first section of this book was headed ‘General Considerations’ and in this section, Tayler outlined what he believed necessary if music was to flourish in New Zealand schools. In this section, he argued that for music to be successful, educators must work to educate children in three areas; performance, composition and listening skills. Of particular interest was his statement surrounding composition:

> The composition or invention of music must not be regarded merely as an accomplishment of the highly trained specialist, for obviously it comes first in order of evolution, and is the first step towards a natural and wholesome enjoyment of singing and playing. (p. 7)

Tayler (1927) was quite clear about the importance of music theory describing it as ‘necessary equipment for the child’s journey’ (p.6) and by teaching it through composition as well as analysis, he believes a greater interest is maintained. Tayler made specific reference to the development of melodic ideas and referred to activities such as developing melodies to fit verses of poetry, an early variation on song writing in the classroom. He also described teachers and students working together to discover what will sound good and work well, and then exploring the reasons behind why this was so.

Of particular interest in a modern context were his comments surrounding listening skills and aural training. While his comments about the ‘inability of the average educated person being able to listen intelligently to a concert of high-class music’(p.5) being a result of neglect in training them how to listen to music, Tayler (1927) argues that music is not ‘printing-ink and paper’(p.7) but rather sounds perceived by the ear. Thus, he believed, music is first and foremost about a training of

the ear and suggests that such training should take place before traditional notation is introduced.

Tayler had a strong Euro-centric view of music prevalent in this era and was dismissive of Maori music represented in schools often by *Songs of the Maori* collected by Alfred Hill. He described the harmony as 'simple' consisting almost entirely of thirds and sixths. He was equally dismissive of popular music and in particular of jazz describing the latter as:

> A musical revolt against the mechanical routine and uninteresting occupation by which the average young man or woman has to earn a living in a shop or office. It is a big blowing-off of steam. (Education Gazette, 1 May, 1928, p. 67 cited in Braatvedt, 2003).)

He condemned popular music in the *Scheme:* 'avoid music of the cabaret type, instruments of ugly tone, comic songs and other trash' (Tayler,1927 p. 25).

Tayler resigned his position in 1931 citing reasons of desiring to pursue his career as an organist and making more use of his talents as a composer and he left to live and work in California (Braatvedt, 2003). It was likely that he was forced to resign because of the economic depression that had just begun in New Zealand. The government was desperately trying to reduce administrative costs in education and despite some progress in school music; it was not seen as a priority in the curriculum. Perhaps Tayler's greatest contribution to music in New Zealand schools was his collection of songs known as *The Dominion Songbook*. The first publication in 1930 contained a collection of predominantly Euro-centric songs but did include three Maori waiata. Other British music educators edited subsequent editions, the most prolific being Vernon Griffiths. These songbooks remained the key music resource in many schools up to, and including, the 1960s.

1.2.3 Developments in music curriculum in New Zealand.

There have been nine separate music syllabi published since the beginnings of an organised state education system in New Zealand, with each syllabus more comprehensive than its predecessor (Sell, 2003). School music in the nineteenth century was limited to singing with some development of musical literacy through tonic sol-fa and traditional music notation. The beginning of the twentieth century saw a continued focus on good vocal production but began to include an understanding of correct breathing, improved tone, more music literacy skills and some aural training. The syllabus in 1914 called for an even more comprehensive knowledge of good vocal technique and a growing awareness of the value of some correlation between music and other subjects leading to some knowledge of music history. From here, it became a logical step to the music appreciation and/or aesthetics education movement prevalent in other parts of the Western world at that time. The technological development of radio and recording media aided this development allowing access to a wider range of genres and styles. As mentioned earlier, Tayler's contribution to music syllabi, the *Scheme of Music Related to Human Life* published in 1927 included a focus on developing listening skills and composition.

Percussion instruments, the recorder and the guitar began to feature in school music programmes from the 1950s and the expansion of trade links from this country to Europe and North America and immigration from both Europe and the Pacific Islands throughout the 1960s resulted in teachers becoming aware of a more multicultural perspective. During this time, the growth in popular music also had a considerable impact on teachers' thinking about music coupled with thinking about the place of music within the wider philosophy of education (Sell, 2003).

It is to the credit of a number of innovative and imaginative teachers that since the 1920s, practice drove as much as it followed syllabi. Teachers were able to contribute to curriculum development and often influential or innovative music educators in schools have been able to inform developments within initially the Department of Education and more recently the Ministry of Educations and the New Zealand Qualifications Authority. From the 1950s, curriculum development in education has become less authoritarian and as a result, new syllabi have been developed in a more consensual manner. A clear result of this has been that school music in New Zealand has expanded considerably from the simple subject of singing in the nineteenth century, to the varied and complex components now found in twenty-first century classrooms throughout the country (Sell, 2003).

1.3 Trends in Music Education in the Twenty-first Century

1.3.1 The social perspective in musical development and education.

Music education has changed rapidly in many countries around the world as a result of rapid social and technological change (Hargreaves, Marshall & North, 2003). Connected to these rapid changes are a number of important questions concerning music education. What should be taught and learnt at school? What is taught and learnt out of school? What are the modern-day roles of universities, conservatoires and community organisations in music learning? What does it mean to be a musician in a digital era? All are important questions to which the answers continue to change very rapidly (Hargreaves et al., 2003).

Hargreaves and North (1999) discussed ways in which the social perspective has influenced music psychology as a whole, in part as a reaction to earlier research in the 1980s, which employed a primarily experimental paradigm. Participants in such studies were often required to make musical discriminations and judgements in

activities concerning pitch, rhythm and chords under laboratory conditions. Such an approach allowed considerable experimental control but the activities lacked any real-life validity. This experimental paradigm was clearly inadequate for the investigation of any real-life experiences of music that has social and emotional as well as cognitive components (Hargreaves & North, 1999).

Hargreaves et al. (2003) provided a more precise and detailed definition of the different dimensions of 'the social perspective' since, they argue, the term covers a wide range of issues and phenomena. The authors argue that all musical behaviour is 'social' in the sense that musical meanings are socially and culturally constructed and that it is useful to distinguish between the four levels of social influence in music psychology.

The first of these is at the *individual* level. The main dimensions of the study of individual differences are well established in psychology and include reference to gender, age and personality. Studies in these dimensions include an exploration of gender stereotyping of music instrument choice, age differences on many aspects of musical behaviour and whether a particular personality type is more or less suited for a particular type of musical endeavour.

The other three levels, the *interpersonal, institutional* and *cultural* represent clear manifestations of social influence at varying levels of directness. The *interpersonal* level includes activities and behaviours such as collaboration with peers in group composition work or small-group effects in choice or taste in music. The *institutional* level includes ways in which institutions such as schools and community groups including orchestras and choirs may influence musical behaviour. Finally, the *cultural* level includes the media, commercial interests and regional and national traditions and cultures. The clearest example of this, and one of the central concerns

of music education, is the emergent youth and pop culture, focusing on popular music and teenage lifestyle and behaviour (Hargreaves & Marshall, 2003; Hargreaves et al., 2003).

Hargreaves et al. (2003) also refer to how the widespread adoption of a social agenda has become very clear in developmental psychology and education. The authors argue that the social-cultural perspective has become the prevailing orthodoxy. This practice involves the recognition that students do not grow up as 'isolated mini-scientists' but rather are influenced by specific cultural events, situations and groups experiences. As a result, most developmental psychologists would now argue that the acquisition of knowledge can only be thought of in terms of its physical and social context. This has resulted in the social perspective being integral to many research studies in music education (Hargreaves & Marshall, 2003; Hargreaves et al., 2003).

Hargreaves and North's (1999) comparative study of the main issues facing international music educators identified the following three 'big issues' from the 15 countries around the world involved in their review.

1. Curriculum issues that centred on the distinction between 'specialist' and 'generalist' music education. These form separate educational pathways in a number of countries. In many countries, specialist music education refers to Western art music. Also mentioned was striking a balance between Western art music, the influence of Anglo-American popular music and local traditional music.
2. Aims and objectives: Here the question asked is about what arts and music education are for. Considerable contrast was identified between East and West. Arts educators in Confucian heritage countries place considerable

emphasis on the moral and spiritual role of the arts as compared to those in the West. Closely allied with this is the different way that music is taught with a clear difference existing between the traditional teacher-centred approach in countries such as India where a pupil literally sits at the feet of their teacher and learns the philosophy, traditions and techniques over a long period, which contrasts with the highly student-centred creativity approach favoured in many Western countries where students' self-expression, creativity and originality are seen as important.

3. The balance between learning music inside and outside of school. In countries in Africa and South America, music is seen as something that is part of everyday life and going to school to learn it seems ridiculous. Informal music education takes place from early infancy and is embedded in every day work and play. The complex nature of formal and informal learning has been at the heart of 'the problem of school music', which appears to be particularly acute in secondary schools. It is clear that pop music plays an important part in students' lives to the extent that it constitutes a 'badge of identity' for many and that music at school and music at home are quite different things (North, Hargreaves & O'Neill, 2000). Key to this is the *authenticity* of school music and its relationship to music outside of the school. Many music teachers are products of Western art music and this model still appears to dominate a great deal of secondary school music.

Alongside the distinction between *home* and *school* music is a third environment that refers to social contexts where music learning takes place in the absence of parents and teachers. It could be in a garage or playground but could equally be in a bedroom or classroom but without any formal activity or adult

supervision. These musical activities tend to be very self-directed and engender a high level of motivation and commitment. The paradox with this environment is that as soon as any adult attempts to become part of these activities they cease to be in the third environment. The challenge for teachers is to create scaffolding structures that are sufficiently integrated with this third environment to provide resources; knowledge and skills, yet remain sufficiently distant from it (Hargreaves & North, 1999).

In summary, Hargreaves et al. (2003) suggest the contexts of music making are critical in determining authenticity for learners and these contexts will continue to change as technology and globalisation advance. They suggest that music education needs to take on board these changes and this may require a re-thinking of the distinctions that have been at the heart of the system for a number of years. This may include the distinction between 'specialist' and 'generalist' music education, the distinction between formal and informal music making inside and outside of school and even the distinction between teacher and learner.

1.3.2 Music education and the everyday experience of music.

Sloboda (2001) raises a series of broad issues about the nature of music education in the twenty-first century. He describes research conducted by Ryan, Boulton, O'Neill and Sloboda (2000) that examined the reasons why students drop out of instrumental music between primary and secondary school. He quotes data from this longitudinal study of 684 school-aged students (aged 11–12 years) where they were asked if they played a musical instrument at three points in time: a) in the last half of the final year at primary school; b) in the first half of the year at secondary school; and c) in the second half of the first year at secondary school. Findings showed that by point c) only 229 of the 420 who said they played an instrument at

point a) were still playing; 191 (45%) had given up. Follow-up interviews detailed a range of issues influencing their decisions to stop playing.

Sloboda (2000) provides a number of conjectures as to why children stop playing. These were as follows:

- *Playing an instrument is seen as boring.*
- *Previously valued achievements are discounted.*
- *Other activities are valued more highly than music (e.g., academic lessons, homework, seeing friends etc.).*
- *Dropping out of music is associated with discourses of autonomy and self-determination.*
- *Future engagement with music is not ruled out but conceptualised in terms of instruments and social networks that were marginal to (and possibly conflicting with) previous involvement.*

1.3.3 The goals and attitudes of classroom music teachers.

Sloboda (2001) discussed a report authored by York (2001) that surveyed 740 heads of music in schools in the UK. This report indicated that at that time, 75% had degrees based in classical music with 50% being classical pianists, singers or organists. From this study, published by the University of Westminster and Rockschool, York concluded that school music tends to be very teacher-driven with music making in the schools dominated by the 'professional' career model based largely on conservatoires and universities. In his report, York says that many of these teachers appeared to be attempting to use contemporary pop and rock examples to extend pupils' musical interests but the majority are doing this with little or no training or professional experience of this genre.

1.3.4 Determining the place of music in education.

Sloboda (2001) also discusses the 'meaning of music'(p.243) and describes it as a constantly shifting function of discourses between diverse stakeholders including teachers, parents, students and governments. He argues that this 'meaning of music' had been 'stable' in the mid-twentieth century with a general agreement among all stakeholders but the underpinnings referred to in the previous section have collapsed as a result of the major cultural shifts most evident from the 1960s onward. Sloboda (2001) suggests that the dominant paradigm of the early to mid-twentieth century in music education could best be described in the following manner with Western art music as epitomised by Bach or Beethoven representing the pinnacle of musical value. He suggests that a deeper understanding of such artworks was, at that time, the most important (and universally applicable) aim of music education. Such an appreciation and understanding was most accessible to those who had the technical and theoretical skills to perform these works and as such all performance-based education was orientated to a significant minority to acquire the necessary skills to be able to play some of the works from this 'canon'. As a result, music was viewed as being best taught by people trained in the understanding and performance of this classical canon.

Gruhn (2006) echoes these views and he suggests that music education, at all levels, was seen as a canon of great art works that were elaborated and notated, performed in concerts as actual events, recorded on CDs, distributed by the media and managed by agents. This is different to the actual musical experiences of many children where they experience music as part of their everyday life experiences when playing computer games, surfing on the internet, from mobile phones and on television or at the movie theatre (Gruhn, 2006).

A revised version of this characterisation emerged between the 1960s and the 1980s. Sloboda suggested it was articulated through the liberal education establishment justifying some broadening of the syllabus but was still very much framed by the pre-existing dominant paradigm as discussed above. In this revised version, 'lesser forms' of musical activities such as jazz, rock, pop and world music may have a legitimate place in the syllabus and may be necessary stopping points for many people. A wider range of styles and genres could permit the development of valuable skills including composition, the ability to work in a group to develop these skills, and using music as a useful vehicle for interdisciplinary education, relating to its cultural, historical and scientific context. However, although this broadening of the syllabus was contemplated, music education remained controlled by those who had undergone formal classical training since this, they believed, remained the pinnacle of the music pyramid to which all should still aspire.

1.3.5 Current trends in music education.

Sloboda (2001) outlines a number of trends that he believes have contributed to the collapse of the traditional paradigm discussed above:

1. Multiculturalism: In the UK, multiculturalism has characterised the country since World War II and has influenced the country to the point that Euro-centric history is no longer dominant in the country. The classical canon as described above is part of European history and culture.
2. Youth Culture: Prosperity in first world countries allows young people unprecedented freedoms and spending power. This, he suggests, allows them to set cultural agendas rather than following those set down by others.

3. ICT: Unprecedented choice and access to ICT has allowed far greater individual autonomy than had been possible previously. Young people can create their own musical worlds easily and cheaply.
4. Secularism: Christianity and any form of organised religion have suffered a substantial decline as a social force in the last 40 years. Key musical organisations to which nearly all children used to be exposed (such as the church choir) are no longer experience by most children. Churches often provided a 'ladder of opportunity' for classical music performers. These no longer exist and schools have neither the resources nor social influence to bridge the gaps.
5. Niche Cultures: ICT developments have allowed affiliations between like-minded individuals and students can swap information such as audio and video clips with others on the other side of the world
6. Postmodernism: All of the above are sometimes considered manifestations of a post-modern society.

The consequence of cultural fragmentation as described in the trends above is that music educators no longer occupy a privileged position. Classically trained music educators represent a small (and increasingly marginal) subset of these sub-cultures that co-exist in a population.

1.4 Contemporary Music Education

A great deal of music education now takes place outside of school as opposed to the formal systematic instruction common in school (Folkestad, 2006; Green, 2001, 2008) This, Folkestad (2006) argues, is a result of recent technological developments and the impact of the media. The result is activities such as listening to and creating music constitutes a major part of many young peoples' lives. The result of this is

teachers never meet musically ignorant or uneducated students. In fact, in many cases, students come to school possessing a rich and sometimes, sophisticated musical knowledge acquired from a variety of outside-school music activities (Green, 2006). Folkestad (2006) suggests that in a formal learning situation the minds of teacher and learner are focused on learning how to play music (learning how to make music) whereas in the informal situation the mind is directed towards playing music (making music). Folkestad describes education as the meeting place for formal and informal learning; formal in the sense that it is organised and led by the teacher, but informal in the sense that the kind of learning that is obtained and the ways in which it is achieved have much in common with the characteristics of everyday learning outside of school.

Lebler (2007) describes an increasingly rapid shift in the way people engage and consume music. Consumers are now turning to digitised forms downloading from the internet and co-creating content by purchasing selected tracks and creating their own play lists and CDs. Lebler suggests that in education, they have become the co-creators of learning, taking an active role in much of what previously teachers have done. One possible implication of this is an acceptance of the rapidity of this change and a need to focus on the development of learning abilities that students will find useful no matter what the future may hold (Lebler, 2007).

Gruhn (2006) argues that music education needs a new philosophy because of the growing gap between extra-curricula activities and the way music is taught in the classroom, and between musical experience in real life and music experience in the school setting. According to Gruhn, a new philosophy must take the change of students' media into consideration because it shapes their understanding of music and their various practices of using sound embedded in different media. Gruhn asserts music had become a synonym for teaching Western art music that was disconnected

from real life—it became a particular attitude for dealing with music in schools rather than with 'real' music. In an attempt to connect with students, Gruhn says that German music education now includes all kinds of popular music and integration of technology in the classroom.

Gruhn (2006) argues that the main goal of music education should be to establish genuine musical representations that allow students to 'audiate', a condition he describes as where the listener adds something from past musical experiences to the perceived sound. Finally, he believes music education should be founded on genuine music learning. This requires teachers who are qualified musicians who know how to 'speak' and 'think' musically and who have a grounded understanding of teaching that promotes designing and implementing an effective sequential learning process (Gruhn, 2006).

1.4.1 Music education in the UK.

In the UK, the creativity agenda in music has been developed for several years following on from the work of John Paynter and other members of the York Project from the 1980s. Rudduck and Flutter (cited in Burnard, 2008b) argue music educators should take seriously what students can tell us about their experiences of being a learner in school—about what gets in the way of their learning and what helps them to learn. They suggest that there is a need to investigate teacher and student research in such a way that it will bring agreement about the 'who' and 'how' of creative teaching and learning practices. Burnard (2008b) argues that in the twenty-first century, we need to make progress in work that allows us to identify and investigate issues that undermine music teachers' professionalism and self-worth.

Many of the traditional skills taught in music and initially supported by technology are now being replaced by more powerful and accessible software that can

utilise problem-solving and role-playing techniques (Hagon, 2003). The use of video, animation, text and 'real' sounds (i.e., pre-recorded loops) can unite to support a symbolically constructed world that represents reality in interesting and meaningful ways for children. With the high number of computers now available in schools at all levels, even very young students can make increasingly complex decisions about composition in music or listen to music in new and interesting ways. ICT in the music classroom allows students to participate actively in the learning process, gaining confidence while developing critical thinking and problem-solving skills. Music educators can also use ICT to create media-rich learning experiences for their students, while extending their reach beyond the classroom walls (Edwards, 2005; Hagon, 2003; Odam, 2000).

As a result of the growth in use of technology and in particular computer-based music technology, students are now becoming increasingly adept at creating their own music and in some cases, may have become alienated by what they are offered in traditional school music courses (Edwards, 2005; Hagon, 2003).They have become technologically proficient and in many cases, musically proficient either at home or from experiences in primary or intermediate schools where other teachers have been able to successfully integrate technology into music classes.

Savage (2005a) argues that we do not need to replace many of the positive teaching strategies and excellent curriculum models that are in place. Rather, we should be looking at building authentic models of ICT-mediated music education. Savage believes that it is not that the traditional music concepts that have had their day but what is needed is a re-prioritising and reordering of what is important. He argues that an uncritical adoption of technology in the classroom will not facilitate a change, it will only allow for a continuation of things as they currently are. In his

view, what a curriculum should achieve needs careful thought. He argues that outcomes in arts education are not always easily connected to stated learning outcomes that are now required at the start of every lesson. He says that this is particularly problematic where, at a basic level, prescribing the outcomes of an artistic activity takes away its sense of discovery and creation. Another suggestion Savage makes, based on his work with modern 'electronic' composers, is that there is a need to look at how teachers may facilitate a cross-disciplinary approach using new technologies to bridge the gap between disparate practices. He suggests that this could lead music education towards a holistic model of artistic practice mediated through the effective use of ICT rather than the traditional music practice merely done using ICT. Finally, Savage suggests that effective use of technology in the classroom depends on its application within the classroom, the surrounding educational ethos and above all, the quality of the individual teacher and his or her relationships with the students. His final vision for an alternative vision of music education in the twenty-first century is as follows:

> At its heart is the use of new technologies to provide space and opportunity for the creation of authentic and novel artistic work, to assist in the transcending cultural values and to empower diversity of expression, to promote critical reflection and go beyond first ways of looking and thinking in the musical, visual and wider performance art domains (Savage, 2005b p.178).

1.4.2 Popular music in schools, experiences from the US.

The suggestion that music educators include popular music in their courses goes back to the 1960s. Participants in the Tanglewood Symposium (McAllester, 1967) challenged music educators to be inclusive of all styles and cultures including 'music of our time' and 'popular teenage music'. The Music Educators National

Conference (MENC) in cooperation with the Berkshire Music Centre, the Theodore Presser Foundation, and the School of Fine and Applied Arts of Boston University sponsored this symposium. The purpose was to discuss and define the role of music education in contemporary US society and to make recommendations to improve the effectiveness of music instruction.

1.4.2.1 The issue of authenticity.

In the US, the inclusion of popular music has seen marching bands playing music by Bruce Springsteen or school orchestras playing pop performances of movie themes—music that was never intended to be played in such a manner (Woody, 2007). Woody says that many music teachers have come to understand the importance of using authentic recordings, authentic instruments and authentic performance practices whenever possible when they are teaching Western art music. However, popular music, which can be considered merely a sub-culture within US music, deserves, in his opinion, the same respect. In a very real way, he believes that respecting the music is respecting our students. Woody argues that if we ignore musical authenticity with popular styles, students will know it.

He suggests that teaching popular music in an authentic manner has a great deal to do with the pedagogical approaches adopted by the teacher in the classroom. A traditional approach, where students are directed to examine a particular work utilising a framework consisting of the elements of music (e.g., melody, rhythm, harmony etc) linked to traditional music theory, is an approach that often may not be appropriate for considering popular music. In many cases, the value of popular music is not derived from its compositional or music theory-related properties. Woody (2007) suggests that it may be more appropriate is to consider the music's emotional and expressive qualities and its relationship to its social and cultural context.

While it might seem appropriate to pursue an approach that includes examination of cultural aspects and social changes surrounding popular music, this instructional approach, Woody (2007) argues, could prove to be unsuccessful unless the students are involved in active music making. One of the reasons vernacular music is 'vernacular' is that it is accessible to all people, including its performance aspect. In his opinion, the best way to learn about popular music is to make it (Woody, 2007).

While this can be said about all styles of music, it is particularly important in popular music styles where for many years young people have learnt about popular styles by 'getting in there and doing it' without having any concern about prerequisite skills. Such view is strongly echoed by Green (2001, 2006, 2008) in her work where she examines learning practices of working popular musicians. This approach, both Green (2001) and Woody (2007) suggest, can challenge the traditional role of the music teacher who is used to being the person that directs rehearsals in a traditional role. They choose the music; they determine the approach in preparing it and even prescribing to ensemble members the expressive details of the performance (Green, 2001, 2006).

In contrast, rehearsals in popular music styles include a high degree of flexibility, negotiation and communal decision making (Green, 2001). Woody (2007) suggests that music teachers would be better seen as facilitators and students should be given the opportunity to make important musical decisions for themselves. Musical exploration and discovery learning, so well accepted in early childhood education, has great potential with older students and generations of popular musicians have accomplished music this way (Green, 2008; Woody, 2007).

1.4.3 Learning processes of popular music.

Green's (2001, 2008) work has provided some real insights into the learning processes of vernacular musicians. One of the most striking elements of vernacular musicianship is the prominence of listening. Unlike many students in traditional school music, aspiring popular musicians spend a great deal of their formative years listening to the styles of music they wish to perform. Green (2001) says that significant listening often precedes their first attempts to play an instrument and only increases once they start to increase their own performance skills. They also engage in different types of listening. Sometimes they 'just listen' and play along with recording for fun. On other occasions, they listen carefully to work up imitative performances of more difficult passages.

Green (2001) says that practice is different too. Practice sessions are marked by a real musical context, meaning that musicians tend to work exclusively on songs, tunes or guitar riffs or licks they have heard. A riff can be described as short rhythmic, melodic, or harmonic figure repeated to form a structural framework within a song. A lick can be described as a short melodic fragment and often a solo is viewed as a series of licks combined into a longer melodic passage. A young guitarist may go into a practice session with the clear goal of figuring out the solo of a song they have just downloaded from the internet.

According to Green (2001), when faced with learning scales and arpeggios, they will learn them if they are relevant to what they are currently playing; if there is an arpeggio figure in the solo, then they will learn it. In addition to the individual skills described above, vernacular musicians will develop skills in a group setting. What they often describe as 'jamming' is what educators would describe as peer tutoring and co-operative learning. In these sessions, a more experienced group

member may lead others in determining chord sequences, specific licks or complex rhythms. In other situations, learning is accomplished more inadvertently as the group works to reproduce a particular song, create new versions or make up an original song (Green, 2008).

One interesting conclusion that may be drawn from these learning processes has to do with motivation. It would appear that the learning activities they engage in seem to be more intrinsically motivating than the solitary, technique-intensive, notation-based practice that teachers require formally trained music students to do. Vernacular musicians describe their practicing as voluntary, enjoyable—even what they love to do.

It is not merely the musical material, but the means of learning that is intrinsically motivating. The process provides greater student autonomy, opportunity for individualised learning through creativity and self-expression, group support and social benefits. This rich process can produce high student motivation that in turn may increase the likelihood that learning will continue and endure (Green, 2001, 2006, 2008).

1.4.4 The skills of vernacular musicianship.

1.4.4.1 Aural skills.

To be authentic in popular music, Green says teachers must teach it in a manner that is true to the processes of vernacular music making; and it is through these processes that students can build the skills that are genuine to this kind of musicianship.

First, vernacular music emphasises functional listening skills. The amount of listening done is one part; the ear drives the practice method. This means that instead of relying on reading music when practising, the student works to recreate what they

have heard when listening to a particular piece of music. As described earlier, this may be a particular riff, a lick or an extended solo.

Research undertaken with beginning and intermediate instrumental music students showed that being able to play by ear is actually a prerequisite to skilled performance of rehearsed music, sight reading, improvisation and playing from memory (McPherson & Gabrielsson, 2002) They argue that it may be easier for an ear-trained musician to learn to read music than it is for a notation-dependant musician to learn to play by ear. Too often, playing by ear is presented as an alternative to being able to read music, when in fact, these skills may be complementary (McPherson & Gabrielsson, 2002).

1.4.4.2 Improvisation.

Improvisation is a skill that tends to be developed through popular music experiences (Green, 2006; Woody, 2007). Preschool children have a natural interest in creating spontaneous songs and exploring sound possibilities on instruments. As they grow older, those who receive music-making experiences in the vernacular style tend to build on their improvisational skills. Unfortunately, historically, little in the way of teaching improvisation has been taught in secondary schools. Although jazz is accepted as part of the mainstream music curriculum, there remains the danger of teaching improvisation via traditional classical approaches of scales and chordal analysis rather than through a more authentic ear-based, trial and error manner and a focus on personal expression, as jazz musicians do.

1.4.4.3 Musical creativity.

As described earlier, much of a popular musician's learning takes place in a collaborative jam session (Green, 2008). While it is true that many budding popular musician's introduction to popular music comes from trying to reproduce songs heard

on the radio, it also a natural progression for these young musicians to begin to work on remakes of standards (arranging) and writing their own original songs (composition). At the core of collaborative composing are shared music tastes, and a desire for personal expression.

These are skills that formal music education has historically struggled to address effectively. However, some of the skills described above are now key components in many national music curriculum statements. The Music Programme of Study at Key Stage 3 (from the UK National Curriculum, 2007) includes references to developing collaborative improvisational skills. The National Standards for Music Education developed by the National Association for Music Education in the US include similar statements. Another possibility is that these skills may be essential for musical longevity—possibly fewer garage band musicians pack their instruments away after their teenage years than their formally trained classical counterparts.

1.4.5 Changing current practice.

Green (2006) points out that the most advanced formal music education systems such as that of the US or the UK tend to have the least musically participatory populations. In all societies, people who acquire the vernacular music skills of their culture commonly include music making as part of their leisure time, family gatherings, social events and informal religious activities. This can be seen in the New Zealand experience of *kapa haka* in Maori culture and the performing groups from Pasifika cultures. Being able to play by ear, improvise and participate in impromptu collaborative performance can facilitate these kinds of real-life music-making activities.

Woody (2007), Green (2006) and Savage (2005) argue that introducing popular music in schools does not mean we have to abandon or change other

legitimate goals. However, it may mean teachers will have to re-examine the breadth of objectives they have chosen for their students. Especially given the huge musical world in which we now live, with all its different styles and ensembles, music educators must be careful not to settle for a limited curriculum that draws solely on tradition. Experience in the UK, the US, Australia and in New Zealand shows that schools that have opted for an expanded music curriculum with alternative courses such as steel drum ensembles, guitar classes and rock bands; the broadening of the offerings has attracted students who normally would not receive music instruction.

1.5 Summary

This chapter presented a brief overview of past and current practices in music education. The overview briefly described important past practice in music education and discussed the contribution some of the important figures in music education and the theoretical underpinnings informing music education during the twentieth century. The overview also provided a brief outline of the changes that have taken place in music education in New Zealand through the twentieth century and into the twenty-first century and begun a discussion around some of the complex issues influencing approaches to music education in the twenty-first century.

The final section of this chapter focused on the increased recognition of informal learning practices concerning music education in schools. Researchers in Europe, the UK and the US have begun to examine how such practices take place. As a result of this research, recognition of the importance of informal learning in music and in particular in relation to popular music styles has led to some different pedagogical approaches in the classroom.

This present study into the impact of digital technology on music education investigates teacher and student perceptions and experiences in four New Zealand

schools. An examination of teachers' responses to technology in education and then specifically in music education takes place in Chapter 2.

Chapter 2: Teachers and Technology

> They want to use technology because it is an integral part of their lives and they want their use of technology to be acknowledged and embraced. (Moor, 2011 p.3)

2.1 Introduction

Before embarking on a review of the literature examining the use of technology in music education, it is important to explore briefly the use of technology by teachers in a wider context. This chapter explores the use of technology by teachers. It begins with a brief exploration of what may be meant by learning and explores some of the epistemological and ontological underpinnings thereof. The chapter then explores the current debate surrounding a socio-cultural and a constructivist perspective of learning. This is followed by a short discussion on how technology has been introduced into the classroom. I then explore the ideas of the 'technology enthusiast' before discussing relevant literature examining actual usage of technology by teachers in countries from around the world. This includes discussion on pedagogical change associated with the adoption of technology in schools. The chapter concludes with a short review of recent research detailing teacher uptake of technology in the classroom and what changes, if any, they may have made to their pedagogical practices as a result.

2.2 Learning Theories

This section will explore the concepts of what may be meant by the process of learning.

2.2.1 What is learning?

Despite being a concept that is seen as an integral part of education, many educational writers and academics are surprisingly inconsistent in their definitions of

what learning actually is (Selwyn, 2011). Hodkinson and Macleod (2010) have this to say:

> Learning is a conceptual and linguistic construction that is widely used in many societies and cultures, but with very different meanings, which are fiercely contested and partly contradictory. Learning does not have a clear physical or reified identity in the world. (p. 174)

Selwyn (2011) suggests that the process of learning 'refers to an individual's acquisition of new skills, or else new forms of knowledge and understanding' (p. 4). An essential element in any discussion around what is meant by learning is an examination of the epistemological and ontological foundations upon which learning may be constructed. There are numerous definitions as to what epistemology is but most describe epistemology as being concerned with the study of beliefs around the origin and acquisition of knowledge (Packer & Goicoechea, 2000; Schraw & Olafson, 2008; Stahl, 2008). Ontology can be defined as the study of beliefs about the nature of reality (Schraw & Olafson, 2008; Stahl, 2008). It can be argued that most constructivist theories of learning have their roots in the work of Piaget and focus on the active character of the learner, interacting with the environment singly or with others and that learning is the resulting construction and qualitative reorganisation of knowledge structures. As Jerome Bruner (1996) states, 'learning is not simply a technical business of well-managed information processing' (p. 146). Instead, learning can be seen to involve an individual having to make sense of who they are and developing an understanding of the world in which they live (Selwyn, 2011). Such theories rest on epistemological assumptions but also include ontological assumptions too. With this in mind, an important part of any discussion surrounding what is meant by learning should include an examination of the socio-cultural and

constructivist perspectives on learning (Packer & Goicoechea, 2000). Packer and Goicoechea suggest that a socio-cultural perspective on learning emphasises characteristics of social participation, relationships (such as the one between novice and master), the setting of the activity and historical change. They argue that a constructivist perspective places emphasis on how knowledge is constructed as a result of 'the learner's action and interaction with the world' (Packer & Goicoechea, 2000, p. 227). They propose that learning involves not only becoming part of a community, and not just constructing knowledge at various levels of expertise as a participant, but also taking a stand on the culture of one's community, in an effort to overcome the alienation that may be consequences of participation. Packer and Goicoecha argue that learning entails both personal and social transformation.

Three key aspects of the socio-cultural approach to human cognition can be identified (Scribner, cited in Packer & Goicoechea, 2000). The first aspect is material and semantic artefacts culturally mediate cognition. The second aspect is human cognition is founded in purposive activity and the third aspect is cognition develops historically as changes at the socio-cultural level impact on psychological organisation (Packer & Goicoechea, 2000). These conceptions are generally traced back to the work of Vygotsky, Leontiev, Luria and others and arise from an attempt to overcome the strict demarcation of person from world.

From this perspective, cognition can be seen as a complex social phenomenon that is distributed or stretched over, not divided among, mind, body and culturally organised settings (Lave, cited in Packer & Goicoechea, 2000). Further, learning is 'an integral part of generative social practice in the lived-in world' (Lave & Wenger, 1991, p. 35). Brown et al. (1989) argue that understanding is developed through continued, situated use involving complex social negotiations so that learning and

cognition are fundamentally situated in activity, context and culture. Learning involves enculturation; picking up the jargon, behaviour and norms of a new social group and adopting its particular belief systems in order to become a member of the culture (Brown, Collins & Duguid, 1989; Lave & Wenger, 1991).

2.3 Teachers and Technology

At its most basic level, technology may be understood as 'the process by which humans modify nature to meet their needs and wants' (Selwyn, 2011b). Human use of technology is usually seen as beginning about two million years ago and it is suggested that this first occurred when natural resources were converted into simple tools. Nye (2007) suggests that technologies were not just used to sustain forms of life but were also used to enhance and improve existing forms of living. This theme of enhancing and improving has remained consistent in the ongoing development of increasingly sophisticated technologies. Early humans' ability to control fire greatly increased their available sources of food (Selwyn, 2011a). Similar to this was the invention of the wheel around 4000 BC, which improved considerably the ability of the people of the time to move around and control their environment. With this in mind, it would appear that little has changed over the millennia as technology may be considered a means of improving existing arrangements. For example, technological advances such as the printing press, telephone and the internet have all lessened the physical barriers and have allowed people to communicate and to interact on a global level. Volti (1992) argues that 'technologies are developed and applied so that we can do things not otherwise possible, or so that we can do them cheaper, faster and easier' (p. 4).

The need to utilise technology in an educational setting has become accepted internationally as a necessary and desirable part of the teaching and learning

environment in which teachers and students currently operate. Most teaching and learning strategies involve the use of some type of resource or equipment. Some teaching methods may only use the simplest equipment such as a whiteboard and pen. Other pedagogical processes may make use of more technologically complex resources such as a digital whiteboard or a computer connected to a data projector. From the earliest times when computers were commercially available, they could be found in educational institutions and educators argued they should be used to support learning (Loveless, 2007; Loveless, DeVoogd & Bohlin, 2001).

When first utilised in educational institutions, computers were used to teach programming but with the development of the microprocessor in the early 1970s, microcomputers became far more affordable and by the 1980s, they were being introduced into schools at a reasonably rapid rate. The exponential growth in the use of computers throughout society led to the desire that students possess computer skills for use in daily life and this, in turn, led to the requirement of a high level of computer literacy. Today, computers in schools are a focus of a study in themselves (e.g., in the area of educational technology) and a support for teaching and learning (Davis et al., 1997; Loveless et al., 2001).

Alongside the development of technology is the rapid rate of change of the world is facing compared to 30, 20 or even 10 years ago. A multiplicity of cultures and value systems are now flourishing, knowledge is growing at exponential rates and Webster (2002a) argues that this change is occurring faster and with more profound consequences at any other time in history. His view is that the content in nearly all subject areas is becoming increasingly complex. Over the last 50 years, considerable research has taken place on how students think and learn. Traditional instructional methods such as rote learning, memorisation and convergent thinking, which were

often influenced by text-based teaching, are being replaced with an emphasis on discovery learning, problem solving and divergent thinking because of the affordances more recent developments in digital technology may offer. Co-operative learning, peer teaching and project-centred learning with the teacher acting as facilitator are becoming increasingly valued as opposed to a more teacher-dominated interaction (Webster, 2002b).

However, it is important to adopt a more objective perspective on the presumed benefits and the transformational potentials that technology may offer (Selwyn, 2011b). Any technology, Selwyn argues, must be viewed in terms of the limits and the structures that it imposes as well as the opportunities it may offer for individual action and agency. It is important to consider that some educational technologies do not always change things for the better. Technologies may not always allow people to do work more efficiently or support people in doing what they want. They may instead have unexpected and unintended consequences. Technologies are often linked to a range of issues far beyond the immediate concerns of the learner or the classroom (Selwyn, 2002, 2011a).

2.3.1 Theoretical foundations of constructivism.

Constructivism as a paradigm or worldview espouses that learning is an active, constructive process. As such, the learner is an *information constructor*. People actively construct or create their own subjective representations of objective reality. New information is linked to prior knowledge, thus mental representations are subjective. Constructivism states that learning is an active, contextualised process of constructing knowledge rather than acquiring it. Knowledge is constructed based on personal experiences and hypotheses of the environment. Learners continuously test these hypotheses through social negotiation. Each person has a different interpretation

and construction of knowledge process. Vygotsky (1978), Piaget (1932), Dewey (1938) and Bruner (1996), among others, all contributed different aspects to the development of this paradigm of learning. Grbich (2007) suggests that constructivism as an epistemological position assumes that there is no objective knowledge independent of thinking. She suggests that reality is viewed as socially and societally embedded and existing in the mind. Further to this knowledge is subjective, constructed and based on the shared signs and symbols recognised by people in a particular culture. Multiple realities exist with different people experiencing them differently.

The following section will focus on the work of Piaget and Vygotsky. Both are viewed as key contributors to the development of constructivism as an epistemological position, but contributed to this development from very different viewpoints. Piaget was principally concerned with the 'ontogenesis of *causal explanation* and its *logical and empirical justification*' (Bruner, 1997). Bruner (1996, 1997) argues that Piaget devised methods of inquiry and a theory appropriate to analysing how children explain phenomena and how they justify their explanations. The biggest flaw in this approach was that he ignored contexts, transactional dynamics, background knowledge and cultural variation. To understand how somebody interprets or understands something requires accounting for their cultural and linguistic background, the context in which they find themselves both in a small communicative situation and a larger patterned cultural system (Bruner, 1997).

Piaget (1932) was primarily interested in how knowledge developed in human organisms. Cognitive structuring of knowledge was fundamental in his theory. According to his theory, cognitive structures are patterns of physical or mental action that underlie specific acts of intelligence and correspond to stages of child

development (von Glaserfeld, 1982). Piaget integrated both behaviour and cognitive aspects in one developmental theory. In his theory, he put forward four primary developmental stages. They are sensorimotor, pre-operations, concrete operations, and formal operations. In the sensorimotor stage (0 to two years), intelligence takes the form of motor actions. Intelligence in the pre-operation period (three to seven years) is intuitive in nature. The cognitive structure during the concrete operational stage (eight to 11 years) is logical but depends upon concrete referents. In the final stage of formal operations (12 to 15 years), thinking involves abstractions.

When it comes to the educational reflections of his theory, Paiget (1932) sees the child as continually interacting with the world around him or her solving problems that are presented by the environment and learning occurs through taking action to solve the problems (von Glaserfeld, 1982). The knowledge that results from these actions is not imitated or from birth, but actively constructed by the child. In this way, thought is seen as deriving from action; action is internalised, or carried out mentally in the imagination, and thus thinking develops. For Piaget, action should be seen as fundamental to cognitive development, and development is the result of two constructs, assimilation and accommodation. When action occurs without causing any change in the child, assimilation occurs. However, when the child adjusts him or herself to the environment in some way, accommodation is involved. Both of these adaptive processes occur together, despite being very different. They are initially adaptive processes of behaviour, but become processes of thinking. Cognitive development consists of a constant effort to adapt to the environment in terms of assimilation and accommodation (Bruner, 1997). In this sense, Piaget's theory is similar in nature to other constructivist perspectives of learning. From a Piagetian

viewpoint, a child's thinking develops as gradual growth of knowledge and intellectual skills towards a final stage of formal, logical thinking.

Vygotsky (1978) was principally concerned with the 'ontogenesis of *interpretation* and *understanding*' (Bruner, 1997 p.64). Here, his emphasis was, accordingly, on situated meanings and on situated meaning making, which, according to Bruner, inevitably generates a cultural-historical approach. Vygotsky's social development theory is one of the foundations of constructivism. It asserts three major themes:

1. Social interaction plays a fundamental role in the process of cognitive development. In contrast to Piaget's understanding of child development in which development necessarily precedes learning, Vygotsky felt social learning precedes development. He states that every function in the child's cultural development appears twice: first, on the social level, and later, on the individual level; and first, between people and then inside the child (Vygotsky, 1978).
2. The More Knowledgeable Other (MKO). The MKO refers to anyone who has a better understanding or a higher ability level than the learner, with respect to a particular task, process, or concept. The MKO is normally thought of as being a teacher, coach, or older adult, but the MKO could also be peers, a younger person, or even computers.
3. The Zone of Proximal Development (ZPD). The ZPD is the distance between a student's ability to perform a task under adult guidance and/or with peer collaboration and the student's ability solving the problem independently. According to Vygotsky, learning occurred in this zone.

Vygotsky focused on the connections between people and the socio-cultural context in which they act and interact in shared experiences (Bruner, 1997). According to Vygotsky (1978), humans use tools that develop from a culture, such as speech and writing, to mediate their social environments. Initially, children develop these tools to serve solely as social functions, ways to communicate needs. Vygotsky believed that the internalisation of these tools led to higher thinking skills.

2.3.2 Pedagogical applications of constructivism.

From the two theorists briefly described above, constructivists suggested that educational experiences should foster a child's progress through stages of development. Most constructivists call for instruction where teachers provide learning activities designed not only to match but also to accelerate students through these stages of development. They believe that education should provide children with more opportunities for cognitive growth through exploration, unstructured learning and problem solving.

Identifying a shared understanding of the term 'pedagogy' is not easy but it is a worthwhile task (Loveless et al., 2001) One definition commonly given is the 'the science of the art of teaching' (Gage, 1985). This phrase provides tremendous scope but does not clarify interpretations and assumptions about the nature of science, art and teaching. Giroux (1997, cited in Loveless et al., 2001) describes it as cultural practice and defines it as 'the transformation consciousness that takes place in the intersection of three agencies—the teacher, the learner and knowledge they create together' (p.64).

Although this definition acknowledges the wider interactive context in which teaching and learning take place, this does not provide a clear focus on the strategies that teachers adopt, nor their reasons for developing and refining them.

Mortimore (1999) describes four main phases in the last 30 years in the research and development of a more complex understanding of pedagogy. These are first, a focus on different types of teachers and styles; second, a focus on contexts for teaching in classroom life; third, a focus on teaching and learning within a learning community that acknowledges the importance of pupils as thinkers and knowledgeable; and fourth, a focus on views of practitioners and policy makers and their conceptions of learning, knowledge and the purpose of education.

Mortimore (1999) highlights the need for a view of learning communities in which teachers and learners are co-constructors of knowledge, and he defines pedagogy as ‘any conscious act by one person designed to enhance learning in another’(p.8).

It is recognised that pedagogy is influenced by the interaction of a range of factors for teachers and learners. Teachers’ performance in classrooms and other learning environments are affected by their approaches to teaching, their beliefs about subject matter, their subject knowledge, their pedagogical subject knowledge, their ‘craft’ skills in organisation and management, their personal characteristics, their perceptions of the current situation, their teaching behaviours and the context in which they are teaching (Moseley et al. 1999).

2.4 The Technology Enthusiasts’ Argument

This section will explore some of the potential transformations that technology, and in particular digital technology, may have in shaping the way teaching and learning could occur in the future. It is increasingly apparent that governments around the world are embracing the concept of the digital age and the potential transformations thereof. These high expectations of education in this new

digital age are clearly indicated in the following statement by a recent New Zealand Minister of Education in an e-learning policy document. He wrote:

> We stand at the start of a new century seeking to transform our nation. The power of education to drive change is a potent as ever. But we can only exercise that power if education itself is transformed and this e-learning action plan will make a substantial contribution to that transformation. (Education, 2006)

Before beginning this discussion, however, it is important to consider just how difficult it is to predict what shape any future may be. A very important point to consider is just how a surprising event may confound the most logically constructed plan (Zepke, 2008). He contends that there is general agreement that the events of 11 September 2011 'changed the future fundamentally' (Zepke, 2008, p. 4). Such an event, Zepke, argues was nearly impossible to foresee and its effects could change the shape of education in the future. Zepke provided a couple of different scenarios to illustrate this change, the first being the speeding up of a virtual classroom due to a political view that mass education is simply too dangerous. The second scenario he described is one where such an event like 9/11 could lead to a breakdown in conventional state-controlled education with the result being communities taking an insulating and autonomous role and completely rejecting the digital age as it currently stands (Zepke, 2008).

Zepke also outlined a key assumption that underpins the digital age metaphor. This assumption is that digital technology will define the way we live, learn and teach in the future. This assumption defines education in the terms of the external world of technology and how teachers and learners are expected to relate to and be shaped by it. As shown in the extract from a policy statement included above, there appears to be

an unquestioning faith in the future of the digital age. Such a discourse appears to ignore complexities, unexpected or obscure consequences and myriads of contextual factors. Globalisation, clashing personal and cultural values, competing epistemologies and pedagogies and religious and cultural fundamentalism remain factors in shaping the future (Zepke, 2008).

With all of the above in mind, I will now explore some of the ways digital technology may change the way we live, work and teach. Collins and Halverson (2009) describe two arguments that 'technology enthusiasts' make as to why new technologies will revolutionise schooling. The first is that the world is changing and schools need to prepare students for this changing world. The second is that technology gives us enhanced capabilities for educating learners and schools should embrace these capabilities to re-shape education. They suggest the following areas where technology may revolutionise schooling:

2.4.1 How we communicate is changing.

Collins and Halverson (2009) point out that people are now using networked digital media for their ongoing business and social exchange and that teens are leading the way in using new digital media to blur the boundaries between personal communication, work and learning. To be able to do this requires a new form of media literacy that extends the symbolic decoding and manipulation of traditional print media by integrating video, images, music and animation comprehension that give rise to new kinds of production. Teens who engage in activities such as creating their own web pages with animated computer-generated graphics and sounds, remixing images to develop music videos and writing their own blogs are engaged in developing a sophisticated media literacy not taught in schools.

2.4.2 Enhanced capabilities for educating learners.

Putting students in learning situations where computer tools will be necessary to solve complex problems will kick start schools to change basic instructional practices. As simply putting computers into schools in the 1980s and 1990s did not produce the revolution people thought it might (Cuban, Kirkpatrick & Peck, 2001), enthusiasts are now turning to more sophisticated implementation models such as the design of interactive learning environments where learners are placed in a new situation and given appropriate tools and supports to learn how to deal with those situations.

2.4.3 Just-in-time learning.

Collins and Halverson (2009) argue for just-in-time learning as the counter to schools traditionally trying to teach everything that someone might need to know, someday. They argue that most people spend 15 to 20 years in school learning things that they may or may not use in later life. As the curriculum becomes more contested, it appears that more information needs to be learnt but the content appears to be increasingly removed from when it might be useful in a real-world context. A better skill could be cultivating the ability to ask good questions (to enable a successful Google search for example) as opposed to regurgitating many irrelevant facts.

2.4.4 Customisation.

One of the major effects of the proliferation of new technologies has been the ability to cater to individual preferences. People can view and listen to what they want via the internet. They can find almost any information they want on the web. Technology enthusiasts believe that customisation offers great possibilities to enhance people's learning. Such enthusiasts envision that in 10 years' time, students will have their own computer-based learning assistant, which will store records of their learning

history in order to guide their learning. Such extensive learning portfolios are now commonplace in many Scandinavian countries.

2.4.5 Learner control.

As new technologies enable people to take control of their own learning, they will make choices about what is valuable to them and what they want to learn. They can make a choice on how long they want to spend on a certain topic and what they think they need. As such, schools are going to be fighting a losing battle to control what students learn. These enthusiasts think that as students decide to take control of their own education, schools will be pressured to embrace the technologies that make learner control possible.

2.4.6 Interaction.

When students are given immediate feedback on their actions, they are more likely to learn what to do correctly. There is a wide range of computer tutor programs in a number of subjects that provide instant feedback for students as they tackle a number of problems. Such tutors are often said to be more effective because of the immediate feedback they provide to the student. Enthusiasts believe that the interaction that computers provide will change expectations for learning in subtle ways that schools will need to replicate.

2.4.7 Games and simulations.

Simulation is the key to letting learners explore new situations. They allow students to try different courses of action and see the consequences of their choices. This is a very useful feature of music software such as GarageBand or Sibelius where students have the opportunity to record musical ideas, listen to them and introduce different ideas quickly and easily. Realistic tasks can force students to figure out what to do in a range of situations ranging from simple to complex. Collins and Halverson

(1999) point out that much of school is like learning to play tennis by learning the rules and practising the shots without ever playing a game. The essential idea in teaching skills is to tightly couple a focus on completing a real-world task with a focus on the underlying competencies needed to carry out the tasks.

2.4.8 Multimedia.

Bringing together text, images, video and audio into multimedia presentations provides a new opportunity for communicating information. Technology enthusiasts note a major impact on learning that video, computers, the internet, video conferencing and so on merging into one large network that will reach anyone, anywhere. Each new media has different affordances and restraints. Video can convey sense and emotion more effectively than text but it is usually watched straight through, which makes it more difficult to study in-depth. Computers are able to support design and simulation in a manner that text and video cannot. Enthusiasts assume that all of the different forms of media will play a role in the design of learning and as such should be able to enhance learning by addressing different learning styles and abilities of students and by using the media most appropriate for the material to be learnt.

2.4.9 Publication.

Student work in schools has always faced the artificial barrier of only being legitimate in the classroom. When only the teacher sees student work, the students often do not experience the authentic feedback that results from exposing work to a real audience. Enthusiasts believe that as student work matures they need the opportunity to demonstrate their learning in legitimate contexts outside the classroom.

The development of the internet makes it possible for student work to be more widely available to the rest of the world. The web is the first mass medium that has

open access so that anyone can publish his or her work in a place that potentially has a worldwide audience. This can be a very positive motivating factor in student work.

Students are leading the way in developing new forms of communication via social networking such as Facebook and Twitter. As such, it makes sense to allow them to take the lead in integrating new technologies into the school. School designs that foster interest-based communities can motivate student learning. Adapting sites such as Facebook and MySpace into the schooling process along in online gaming could introduce technologies students live with outside of school into the world of schooling. Enthusiasts argue that the presence of such technologies would push schools in the direction of the liberating possibilities of new media rather than limiting their use through acceptable use policies.

2.4.10 The enthusiasts' vision of schooling.

Computer-based digital technology environments offer a revolution in schooling of the same magnitude as the revolution in our culture set in motion by the Industrial Revolution. They favour a constructivist approach to learning, where students, as opposed to teachers, do most of the work. A major motivation for many technology enthusiasts is their unhappiness with current education. They subscribe to Dewey's (1938) notion that students should be actively engaged participants in learning, sharing their knowledge with one another, rather than competing for grades.

Enthusiasts do not like the aspects of the traditional school where students are supposed to sit still and listen to their teacher talk, memorise the information provided to them and then regurgitate it in a test. They believe that this approach destroys most students' curiosity and desire to learn. While many progressive educationalists have tried to improve the current system with improved assessment procedures, curriculum re-design, ongoing teacher professional development and the like, enthusiasts believe

that digital technology may be able to provide the kinds of immersive, customised and adaptive learning opportunities that can reach students that currently fail in the established system. Technology enthusiasts envision schools where students are working on realistic tasks and adults play a supportive role to guide them to new activities and help them when they encounter difficulties.

2.5 New Ways of Teaching and Learning in the Digital Age

Somekh and Lewin (2009) define curriculum (Stackhouse, 1975 cited in Somekh & Lewin, 2009) as the learning, both planned and unplanned, that results from the interactions between learners and teachers within an educational setting. This definition can be seen as different from many of the recent developments in curriculum by governments where there is a strong focus on goals, outcomes and specific syllabus specifications. The first definition assumes a constructivist theory of learning in which interaction with the teacher is an essential component. It does not remove the responsibility from schools and teachers for selecting and presenting knowledge and activities designed to educate learners.

2.5.1 The impact of ICT on teacher–pupil interactions.

The introduction of ICT into schools has an immediate impact on the interactions between teachers and learners (Somekh & Lewin, 2009). Currently, there is much discussion internationally whether information technology (IT) is a subject in its own right or a description of the tools and resources used to support the teaching and learning of other subjects in the curriculum (ICT). Construction of knowledge from information requires far more than the ability to use a variety of ICT techniques or skills with the latest range of software applications; it relates more to an ability to question, access, interpret, amend, analyse, construct and communicate meaning from

information. This may be called ‘IT capability’ (Loveless, 1995) or ‘information literacy’ (Loveless & Longman, 1998).

Somekh and Lewin (2009) suggest the impact of ICT on interaction is most obvious, and in many cases unsettling for teachers, when it draws the focus away from the teacher to the computer screen. This can be observed to occur with different degrees of ‘distancing’ from the teacher. At one end of the continuum is the teacher in front of the class using an interactive whiteboard or data projector and remaining very much in control even if the learners’ eyes are focused on the screen. At the other end of the continuum are learners working with interactive computer-based material autonomously from the teacher, singly, in pairs or in small groups. Again, the teacher’s presence is withdrawn from the learners’ line of vision, but now for a greater period.

2.5.2 Learners’ current experiences of using ICT at home and at school.

Many students have access to state-of-the-art computers and broadband connectivity at home and their access to the internet is often unrestricted in terms of both time and screening filters. Unrestricted access to the internet provides young people access to a very wide range of resources and information that were out of reach of their parents’ generation (Webster, 2007). The power of technology to transform the nature and procedures of almost all human activities is evident in the changes that have taken place in our social practices. Examples here include personal banking from home, purchases on the internet, search engines that are now dominant including changing from a noun, Google, to a verb, to google. Young people use these technologies to engage in wide range of activities, often multi-tasking sending emails, chatting to virtual friends, downloading music, composing their own music, playing online games in a virtual world, visiting websites of sports stars or music celebrities,

the list goes on. The real empowerment is that young people can access a very wide range of information without it being pre-selected or controlled by parents or teachers (Selwyn, 2011a).

2.5.3 'Flow'.

From a large number of interviews with highly successful and creative people ranging from musicians to internationally recognised scientists, Csikzentmihalyi (1996) found that their engagement in activities was often characterised by a state of heightened consciousness, which often involved loss of awareness of other factors such as physical location or the passing of time. He called this heightened consciousness 'flow'. Students, when questioned specifically about losing awareness of time or location when engaged in using ICT, were able to give descriptions of the exact activity they were engaged in when they experienced 'flow'. Analysis of their accounts clearly showed they were linked most strongly either to 'gaming' activities or to creative activities such as building their own website (Somekh, 2006).

2.5.4 Traditional models of schooling.

The institutional constraints of schooling, which perpetuate traditional structures such as timetables, subjects and prescribed tasks, focus more on control as much as on teaching and learning. When curriculum is pre-specified nationally as a body of information and concepts to be transferred from teacher to student, and where students are subsequently tested to measure the effectiveness of the transfer, knowledge itself is tightly controlled. The current international trend to develop curriculum with levels and targets of attainment may result in teaching that becomes a technical process of transferring information rather than the kind of inspirational mentorship. Current schooling models result in school administrators keeping tight control of classroom practices within the parameters set by managers or inspectors.

When individuals or groups at any level try to institute change, they meet with resistance from either peers or those at other levels. The result is that schools operate as steady state systems that are remarkably resistant to change (Davis et al., 1997; Somekh, 2007; Way & Webb, 2007).

2.5.5 New models of schooling.

Somekh (2007) argues that there is an urgent need to transform schooling but the task is a complex one requiring commitment to a shared vision of radical curriculum change from teachers, parents, school managers and policy makers. Teachers have a specific role to play in making specific links between learning at home and learning at school. This can include encouraging young people to use ICT at home to explore and investigate as a means of extending the curriculum and to act as role models as learners themselves—a role they can more easily fulfil with ICT tools to assist them. Education systems should provide the essential structures for learning, selecting from the accumulated knowledge of generations what the next generation needs to know to play a full part in society's activities. However, rather than being tightly controlled and specifying exactly what students will learn, the curriculum framework should be flexible and locally negotiated by schools to take into account parents and communities' interests and to leave room for students to follow their own paths of investigation.

2.6 Teachers' Use of ICT

ICT can contribute to innovative, student-centred learning environments that stimulate learning, discovery learning and higher-order thinking skills. This can be accomplished by adapting lesson content and learning activities to the needs of individual students, facilitating cooperation and providing rich contexts with authentic learning tasks (Smeets & Mooij, 2001). However, despite widespread claims about

the potential of ICT to benefit education (Cuban, 2001; Davis et al., 1997; Jonassen, Howland, Moore & Marra, 2003; Somekh, 2006; Tapscott, 1999), it would appear that ICT has made comparatively little impact on teaching and learning in schools (Cartwright & Hammond, 2007; Cuban, 2001; Somekh, 2008; Way & Webb, 2007). Around the world, where visionary policy initiatives to integrate ICT in the classroom have often resulted in minimal pedagogical change, evaluators of such initiatives tend to allocate blame on teachers and suggest more *training*. As a result, a deficit model has developed that assumes failure has been caused at the levels of the school and the classroom and teachers' *resistance* to change (Somekh, 2008).

Somekh (2008) argues that this so-called resistance can be partly explained by socio-cultural theory that assumes that change processes in schools and classrooms cannot be viewed in isolation. Activities in schools and classrooms are co-constructed with students and local communities, and are constrained and enabled by regulatory frameworks often derived from national education systems and cultures. She suggests that teachers' beliefs and attitudes and their confidence and competence with ICT remain central in their adoption of such technologies in their classrooms. However, they are not 'free agents' and their use of ICT for teaching and learning depends on the inter-locking cultural, social and organisational contexts in which they live and work. Legislative frameworks and organisational structures of schools often make it impossible for ICT tools to be explored and appropriated pedagogically. These things severely constrain teachers and students' activities because they are in effect the cultural tools that mediate pedagogies of blackboard and chalk. In many cases, they may be responsible for reinforcing teachers' traditional roles and beliefs.

Dillon (2004) argues that the main locus of inquiry surrounding ICT has been at the integration of computers into schools at the level of teachers and students. He

says that very little attention has been given to its theoretical foundations and, as a result, ICT has had applied to it theoretical perspectives developed in other areas of education and from instructional design. The latter, he describes as a boundary area that utilises both educational and technological theories. He argues that most practitioners of ICT would say that they work in a social constructivist context, which takes into account the situatedness of learning and its collaborative nature (Lave & Wenger, 1991). As a result, the emphasis in the design of computer-based learning environments appears to have shifted from information transmission to knowledge construction. However, Dillon (2004) contends that the relationship between educational process and technological means is still heavily influenced by fundamental assumptions derived from information theory about the nature of information. These assumptions are predicated on a process of deconstruction and construction in the systematic transmission and transformation of information in the course of learning. Dillon argues that the intervention of technology in learning processes is seen as adding value to sensory range, the processes of coding, selecting, categorising and abstracting information, and to educational interventions and transactions (Dillon, 2004). In his opinion, teacher reluctance to include more activities using many of the affordances of ICT is connected with a preoccupation with procedural knowledge and skills: knowledge of software and applications and an emphasis on student proficiency in using them. He believes that many teachers remain concerned that the skills of their students are more advanced than their own. He suggests that teachers should accept that this will always be the case because students have more time to explore software and are always prepared to take more risks. Teachers, he says, should have wisdom, provide guidance, and utilise their craft knowledge to provide contexts in which the students can make sense of information.

Way and Webb (2007) examined relevant literature surrounding the reluctance of teachers to integrate ICT into their teaching practice. They found that although some teachers were utilising technology in multi-dimensional ways, many were not. They expressed considerable surprise at this, particularly considering the saturation of ICT in the business world, the general community and pressure from government bodies. They suggest that findings from accumulated research into this phenomenon show four possible explanations; that some teachers view the use of ICT as incompatible with their wider educational beliefs, that there may be strong social obstacles to the greater levels of integration, that there may be obstacles at the school level and finally that the obstacles may have to do with the personal characteristics of some teachers such as confidence.

2.6.1 Pedagogical change and ICT.

The research literature surrounding pedagogical change because of the implementation of ICT offers little support for the popular rhetoric about technology revolutionising teaching and learning or teachers fundamentally changing their pedagogical approaches and re-working their lesson plans (Hennessy, Ruthven & Brindley, 2005). Goodson and Managan (1995) said they found ‘evidence of reshuffling the pack of cards but little evidence of anyone trying a new game’ (p. 119).

Further studies in the UK and the US show that relatively few teachers are integrating ICT into subject teaching in a way that motivates students and enriches learning or stimulates higher-level thinking with reasoning. Many classroom teachers are simply using the technology to do what they have always done, although they may in fact claim that they have changed their practice (Cuban, 2001; Hennessy et al., 2005; Southcott & Crawford, 2011). Successive governments around the world have

revised curriculum statements with provision for opportunities and expertise for using ICT in schools; Hennessy et al. (2005) report significant weaknesses in policy and practice. They describe subject curricula, assessment frameworks and policies within individual schools surrounding the use of ICT appearing to both encourage and constrain teachers in using technology in the classroom. A key finding in the research carried out by Hennessy et al. (2005) was that for many teachers subject pedagogy is dictated by the nature of external examinations students are required to sit and as a result the use of ICT (unless specifically mentioned in the examination requirements) must take second place to guiding students to examination success.

2.6.2 Pedagogical beliefs concerning ICT integration.

As described above, some of the literature surrounding the integration of ICT by teachers into their classrooms shows little real innovation and changing of existing practices. Kiesler (cited in Beckstead, 2001) refers to the use of technology as either 'amplicative' or 'transformative' (p. 47). What is meant by the former is that technology in the classroom can be used to do traditional tasks better or more efficiently. However, a transformative impact is one that 'shows a qualitative change in how people think, act and react'.

Saloman and Perkins (2005) describe three different kinds of effects of technology related to learning: effect *with*, effect *of*, and effect *through.* Effects *with* technology take place when technology enables the individual to reach a higher level of learning than without technology. Effects *of* technology mean that technology gives the student experience and practise, which is also useful when technology is not present. Effects *through* technology mean that the activity in question changes or is being restructured (Saloman & Perkins, 2005).

Other writers (Mark & Madura, 2010; Ruthmann, 2007) describe technology use where teachers continue with the same activities using technology to support them as computer-aided instruction (CAI). Where the potential of ICT is used to enhance creativity, facilitate learning, and encourage exploration and independent learning (Bray, 2000), this can be described as computer-aided learning (CAL).

There is an expansive literature associated with the concepts of digital literacy and many of these concepts have been described in various sources (Belisle, 2006; Martin, 2006). Martin's (2006) definition of digital literacy is:

> The awareness, attitude and ability of individuals to appropriately use digital tools and facilities to identify, access, manage, integrate, evaluate, analyse and synthesize digital resources, construct new knowledge, create media expressions , and communicate with others, in the context of specific life situations, in order to enable constructive social action; and to reflect upon this process. (p. 19)

Martin's(2009) more recent research continues to apply this thinking and is evident in the development of three 'levels' of digital literacy. These levels are digital competence (which Martin argues is a precursor to digital literacy); digital usage and digital transformation. Digital competence, according to Martin, includes skill acquisition with a full range of digital tools; finding information; preparing and publishing digital resources using software tools; and includes various forms of electronic communication and interaction. Digital usage, Martin argues, embeds skills and concepts drawn from digital competence and contextualises them in real-life situations. Users draw upon relevant digital competencies and apply them to specific contexts and these competencies are shaped and adapted by the requirements of the situation and the 'digital usages' are 'uniquely shaped' by the expertise of the

individuals, their life history and their wider experiences. Digital transformation, Martin argues, is the ultimate stage of digital literacy where the *digital usages* are developed to facilitate innovation and creativity resulting in stimulating significant change within the personal or professional domain. Martin's research suggests that while the process of reflection is needed in all stages of digital literacy, it becomes essential here. Critical reflection and reflective action is a key requirement of the transformation stage (Martin, 2009).

Hennessy et al. (2005) focus on the 'amplicative' theme or CAI and describe a range of themes where ICT is used to 'support, enhance, and extend existing forms of subject teaching and learning' (p. 173). In this they conceptualise the contribution of technology use as a) affecting working processes and improving production; b) supporting the process of checking, trialling and refinement c) enhancing the variety and appeal of classroom activities; d) fostering student independence and peer support e) overcoming student difficulties and building assurance; f) broadening referencing and increasing currency of activity; and f) focusing on overarching issues and accentuating important features.

In a review of relevant research literature on ICT use and pedagogy, Way and Webb (2007) suggest that much of the material reviewed generally distinguishes between practice involving teacher-centred approaches and practice involving student-centred approaches. They also note that ICT use in teaching and learning context is sometimes associated in the literature with innovative classroom practice, sometimes concerning CAL. They reference the growing body of research that identifies the potential of ICT to transform pedagogy in the following ways as a) a shift from instructivist to constructivist educational philosophies; b) a move from teacher-centred to student-centred learning activities; c) a shift from a focus on local

resources to global resources; and d) an increased complexity of tasks and use of multimodal information.

2.6.3 Teachers' commitment to ICT and caution about ICT.

For teacher commitment to integrate ICT into subject practice, they need to recognise the educational value and believe in the transformative potential of the technology (Hennessy et al., 2005). Further, they suggest that teachers need to integrate ICT into their schemes of work, discuss with colleagues how they can ensure consistency of use between teachers working in the same subject area, respond effectively to internal and external pressures and work to overcome restraints that may be imposed from either external forces (e.g., external examination requirements) or internally (e.g., limited access to resources including the internet).

Hennessy et al. (2005) also identified areas where teachers described caution surrounding the use of ICT in their subject practice. They describe evidence of a conservative approach to harnessing the powerful potential of ICT to support learning. The suggest that some teachers identified pedagogical concerns where they believed dangers existed in uncritical use, ICT use because it was available but not relevant to the actual activity and a potential for unlimited access to information actually sabotaging what they considered was important specific subject knowledge.

2.7 Summary

This chapter presented a brief overview of possible concepts of learning, followed by a brief discussion on some theoretical underpinnings of constructivism that builds on the concepts of learning. I then explored some of the technology enthusiasts' thoughts on how technology could be incorporated into teaching in schools. Following this, I explored how technology may be changing the interactions between teachers and learners in schools. Finally, I looked at some of the literature

that reports on the implementation of ICT in schools and why teachers may or may not integrate technology into their teaching processes. I emphasised pedagogical processes in this section, as I believe it is important to identify why and how teachers may be changing the way they work.

Chapter 3: Technology and Music Education

3.1 Introduction

In this chapter, I will review a range of literature describing the implementation of digital technology in music education from around the world and explore some of the literature surrounding the growth of popular music in music education. I will begin by providing a brief history of the use of technology in a wider context in music. This is related to the ongoing refinement of existing musical instruments and the development of new instruments. I will then briefly discuss the early use of digital technology in performance and composition before focusing on recent developments in music education from the end of the twentieth century and into the new millennium. The next section explores some of the literature describing the growth of popular music in the music curriculum in the US, Great Britain and in Finland. This is important and is included in this chapter because much of the burgeoning use of digital technology is connected with the introduction popular music studies and practices in the classroom. The final section is concerned with more recent studies into the use digital technology with a specific focus on composition and explores the concepts of amplicative or transformative applications of technology in the classroom. This is followed by a description of a case study of a teacher employing digital technology in the classroom when teaching composition.

3.2 History of Technology in Music

Through the years, advances in technology have led to changes in how music is performed and taught. The word ‘technology’ comes from the Greek words relating to art and skill and discourse and communication. Musicians have always been great users of technology (Boody, 1990). Evidence for this can be seen in the instruments have evolved over time, beginning with the simplest of drums and early strung lyres

and harps. Pianos evolved from a simple mechanism that plucked strings to short, hammered arms that hit strings. Brass instruments evolved from simple straight trumpets and animal horns to more complex instruments complete with valves that allowed players to play in different keys. Woodwind instruments also evolved with the development of more complex keys and levers allowing a greater range and more accurate intonation (Beckstead, 2001; Boody, 1990).

In the early 1980s, education professionals were justifying the use of technology by arguing that it allowed for students to learn by doing and by thinking about what they do (Taylor, 1980). Such arguments were grounded in the constructivist theories of Dewey and Piaget. Initially, computers were used mainly for text manipulation and as a place to organise information. However, the development of the internet has resulted in the ability for teachers to bring the world to the classroom. Video, animation, text and sound are now being combined to support a symbolically constructed world that students find more realistic and meaningful (Hagon, 2003).

Throughout history, teachers have used applied science to help student understanding of the very complex art form that is music (Webster, 2002b). Many of the traditional skills taught in music and initially supported by digital technology are now being replaced by more powerful and accessible software (Hagon, 2003). The use of video, animation, text and ‘real’ sounds (i.e., pre-recorded loops) can unite to support a symbolically constructed world that represents reality in interesting and meaningful ways for children. With the high number of computers now available in schools at all levels, even very young students are able to make increasingly complex decisions about composition in music or listen to music in new and interesting ways. ICT in the music classroom allows students to participate actively in the learning

process, gaining confidence while developing critical thinking and problem-solving skills. Music educators can also use ICT to create media-rich learning experiences for their students, while extending their reach beyond the classroom walls (Edwards, 2005; Hagon, 2003; Odam, 2003; Webster, 2002a).

3.2.1 Technology in performance.

ICT can be seen as a way of enabling attainment in performance activities in music. Mills and Murray (2000) describe the use of sequenced backing tracks aiding student attainment in performance by removing the difficulties students sometimes face when their live accompaniment goes awry. They describe teachers being able to vary tempo as performances become more fluent or to transpose them for students who are doing vocal performances. Using backing tracks, teachers were reported to be helping students' understanding of the structural relationship of the part they were playing compared to that of the accompaniment. In addition, they reported that if a student decided to use a sequenced backing track teachers would expect students to be able to control tempo and dynamics with a high deal of attention to detail that might not be possible with live performers.

3.2.2 Creativity.

Technology in music can also be viewed as something more than just the hardware designed to solve a performance problem. Technology can also be viewed as more than just a tool for learning how to use music notation software or designing a multimedia presentation for a music history assignment. Rudolph et al. (2005) describe using technology as a way of engaging with music in an effort to improve the musical experience while always respecting the integrity of the art. Webster (2002a, 2002b) argues that it is not just the technology that is significant, rather the use of it that can allow students to think and react musically. He says that students today do

not know of a world without computers, electronic keyboards, MP3 files and file players, compact discs, the internet and a range of other digital music devices and formats. Perhaps, he suggests, sometime in the near future, students will come to know a new music technology that none of us can completely understand today (Webster, 2002b).

Music technologies appear to be pushing the traditional boundaries and challenging traditional notions of what constitutes music composition as well as notions of the abilities and skills humans need to learn to compose and perform music (Gouzouasis, 2005). He argues that sequencing software such as GarageBand may begin the transformation of the way humans create and perform music. Technologically mediated music can shake the most cherished practices of classroom music teachers—but, conversely, it can generate the desire to (and ways in which to) diversify existing pedagogical practice (Gouzouasis, 2005).

3.2.3 Composition before 2000.

Surprisingly little has been written on the teaching of composition in schools before the year 2000 (Odam, 2000). As discussed in Chapter 1, much of the work with composition in the classroom was heavily influenced initially by books prepared by R. Murray Schafer from Canada in the 1960s. In 1970, Paynter and Aston produced an influential book that sought to move music teaching away from prescriptive traditions towards a more child-centred creative approach, with the freedom to explore chosen materials. That book was *Sound and Silence*.

Witkin's (1974) *The Intelligence of Feeling* also had significant impact on music education in that it argued that the arts in education offer us not so much a product but rather a process—a vital instrument in the education of feelings (Thwaites, 2008). In this publication, Witkin was particularly scathing of music

education, its content and methodology. He claimed that 'despite its long and in places impressive tradition, it [music] repeatedly fails to obtain a general hold on the musical development of the majority of pupils and is considered by many pupils to be irrelevant to anything that really concerns them' (Witkin, 1974 p.118).

In 1982, the book *Music in the Secondary School Curriculum* was prepared by the York University Schools Music Council under the direction of Paynter. In this publication, Paynter provides a reasonably comprehensive picture of methodology for composing, which he sees as best done by small group workshops. The requirement to teach composition was part of the revision of the GCSE in England and Wales in 1987. This revision 'brought music education officially into the realms of arts education where pupil-centred learning, creative work and problem-solving techniques in other arts disciplines had been the norm for decades' (Odam, 2000, p. 109).

Although composition was part of the external examinations in music in New Zealand for a number of years, the tasks were very simple word-setting exercises or a requirement to write a short 16 bar piece, such as a fanfare for some form of special occasion. In 1989, the incumbent Labour Government supported the publication of *Syllabus for Schools—Music Education—Early Childhood to Form Seven* (which is still regarded by many as a seminal document for music education in New Zealand). Its dominating mantra was 'create, recreate and appreciate'. The syllabus was supported through 1993–1994 by handbooks for music education from early childhood to secondary music, and these were distributed to all schools (Thwaites, 2008). In 1993, a new external examination prescription was introduced, one that placed more value on performance and composition (60%) than the study of music works (appreciation), theory and aural training. Interestingly, at the time, several

school principals complained about the inclusion of the practical component, for music ‘used to be a good academic subject’. The subsequent revision of the curriculum in 2006–2007 extended the requirements even further making specific mention of ‘music–sound arts’ where previously it was titled just ‘music’ (Ministry of Education, 2007). By doing this, it became explicit that the study of music included sounds coming from ‘natural, acoustic and digital environment’ (p. 21) and any activities relating to the study of music should include working with appropriate digital technology.

Odam (2000) identifies composing as being firmly established in the curriculum in many countries around the world. He believed, at the time, the development of digital technology in the music classroom was essential to the continued growth and health of music education in schools and music classrooms should be effectively equipped for such resources. Practical activities related to what have been discussed above were, in his view, essential. Teachers, he argued, need to be prepared to use whole-class instruction where necessary to model specific activities to the class and to work with them when appropriate. He believed the ultimate aim of composing in the curriculum must be to fire the imagination in the students and to motivate them to produce their own work. Composition is seen as a powerful form of self-expression and should be at the centre of a music educators’ work (Odam & Patterson, 2000).

3.3 Computer-based Technology and Music Teaching: 2000 to 2005

Reviews of research and music technology growth from 2000 to 2005 indicated a significant increase in the power and availability of hardware and software for music teaching and learning but it appeared that teachers in schools were lagging behind in their application of these new resources. There still seemed to be a lack of

real evidence about how committed music teachers were to the implementation of technology into music instruction. What was also lacking was some extensive dialogue about the conceptual bases for including music technology, with few major efforts made to develop a philosophy relating to the use of such technology (Webster, 2007).

A number of significant studies were undertaken in the early 2000s looking at how teachers were responding to new curriculum demands in music. Of particular relevance to this study are papers by Mills and Murray (2000) who reported on what they considered good teaching in music at Key Stage 3; Pitts and Kwami (2002) who looked at how teachers were using ICT to raise student achievement in composition; and Byrne and MacDonald (2002) who examined the use of ICT in the Scottish Music Curriculum.

Mills and Murray (2000) were working for the Office for Standards in Education (OFSTED) and prepared their report as part of OFSTED's commitment to 'improvement through inspection' (p. 129). In their study, they reported findings from visits to 52 schools in England focusing on good teaching using music technology in classes with students aged between 11 and 14, referred to in the report as Key Stage 3.[2]

They begin by identifying what they mean by 'good music teaching' and refer to OFSTED's publication *Framework for the Inspection of Schools* (1995). In this document, good teaching is defined in terms of its effect on students' attainment. This document also says that good teaching enables students to make good progress. Mills and Murray (2000) provide seven criteria upon which they, as inspectors, judge

[2] **Key Stage 3** (commonly abbreviated as **KS3**) is the legal term for the three years of schooling in maintained schools in England and Wales normally known as Year 7, Year 8 and Year 9, when pupils are aged between 11 and 14.

quality in a music lesson they observe. In this discussion, I will focus on the first three as outlined below, as they are the most relevant:

1. The teacher set a good example to the students, encouraging them to take music, and the use of ICT in music, seriously.
2. The teacher was knowledgeable about the resources in use.
3. The teacher had thought about how the resources would be used to promote progress in music.

When elaborating on the first criterion, Mills and Murray (2000) described teachers who exhibited a high level of enthusiasm, and composed and performed during lessons. These teachers worked alongside the students, almost as fellow musicians, and were able to use ICT resources with the same facility and the 'same sense of musical purpose as they, or others, may use a violin or piano' (p. 133)

For the second criterion, an important aspect was teachers being knowledgeable about the music applications of the resources they were using. Included in this was an awareness of strengths and weaknesses of specific applications and teachers often used 'well-chosen examples of commercial recordings or their own compositions to raise the musical expectations of students' (Mills & Murray 2000 p. 133).

The third criterion has important considerations for effective pedagogy. Mills and Murray (2000) found that teachers using ICT effectively would plan lessons that had clear learning outcomes indicating what students would *learn*, rather than just what they would *do,* in a particular lesson. Here, they described ICT being used for a musical purpose and not just as an end in itself. Examples they described include learning new functions and skills that would allow them to improve either individual or group performance. An important consideration for them was the teacher

encouraging the students to use their ears to appraise the musical effect on what they were doing and not allowing ICT to dominate the activity. In other words, the students should listen to what they were doing and not using ICT in an inappropriate manner. The teacher was continually monitoring what the students were doing, providing suggestions for improvement and working at raising students' expectations of their own achievement.

Mills and Murray (2000) also identified how ICT could add value to students' motivation and progress. They identified a number of ways in which teachers were able to do this using ICT. In performance situations, they described innovative use of backing tracks to help students in performance. Teachers were able to vary tempo as vocal or instrumental performances became more secure while working directly with students instead of having to concentrate on playing the accompaniment themselves. With composition tasks, the use of ICT allowing students to write and playback music that they might not ordinarily be able to play themselves was discussed in some depth. They also observed how, in many cases, students were not held back with a lack of understanding of notation or memory of parts. They could also 'choose a keyboard backing for a song that they composed themselves by considering matters of style and effect, rather than whether they could play it or not' (Mills & Murray, 2000 p. 141).

Mills and Murray (2000) describe the effect on motivation of students as 'almost tangible' (p.142). Backing tracks generated via a computer with an almost professional sound quality appeared to encourage students to perform with more enthusiasm, expression and accuracy. The ability of some teachers to find a range of related excerpts of music often broadened the students' musical experiences and, in some cases, resulted in students returning to the music room at lunchtime or after school to continue with the work they had been doing during their lesson.

When discussing the use of ICT with students, Mills and Murray (2000) found that the students, almost without exception, were enthusiastic about using it in their music classes. Some students said they had asked their parents to buy them a keyboard so they could practise the pieces they had worked on at school. In some cases, students enjoyed the intersection of activities as a few used a range of ICT in their homes to create music. The students said they were very excited when they found that they were starting to do the same things at school and 'commented favourably that classes at school now allowed them to do the musical activities that they had previously undertaken only at home' (Mills & Murray, 2000 p. 142).

The development of music technology and the use of ICT in the music classroom have developed considerably since the 1990s. Both software and hardware and their respective capabilities have increased in both scope and complexity. In their study, Pitts and Kwami (2002) describe how a music technology specialist could be viewed in the same way as a teacher may be considered a string specialist. They also discuss the tension between those who believe computers should be an adjunct to what teachers are currently doing, as opposed those who see computers and the use of ICT as redefining the role of the teacher in the future (Beckstead, 2001; Cain, 2004).

Pitts and Kwami (2002) found that at that time many secondary school teachers were making use of ICT creatively to raise their students' performance in composition tasks. They note that the mass production of keyboards has brought a cheap and accessible technological resource into music classrooms. Their research showed students were engaged in composition activities when using ICT. They identified the most effective progress was observed where teachers related the use of technology to prior musical learning of chords or song structure. From their study, they found students attained the highest standards of composition when they were

given musical and technological information, as they needed it rather than being overloaded with theoretical information before embarking on a task. This 'just-in-time' approach appeared more effective than if students were provided with too much information. Pitts and Kwami found that if the students were 'bombarded' with technical data related to the operation of particular features in software they tended to be overwhelmed.

Pitts and Kwami (2002) also discussed the potential use of ICT as an 'e-panacea' where it could be used in nearly all activities, often in what they considered was an inappropriate context. In these situations, the authors described teachers using ICT for activities that have usually been completed using traditional instruments. In their view, teachers who want to avoid inappropriate use structure a lesson appropriately and balance activities so that ICT was used where it was necessary and other resources and methods employed where it was not. They argue that good use of ICT can combine a range of musical activities resulting in a highly relevant and immediate resource for students.

In their paper, Pitts and Kwami (2002) argue that composition does require some mastery of three elements; musical knowledge, instrumental skill and skill handling technology. Musical success was possible with some of, or all of, these skills but where students were really enthusiastic and achieving well, the teachers working with them were comfortable demonstrating skills in all three areas. They reported that at its best, ICT did enable attainment in music by opening up avenues of exploration. It allowed composition of pieces that students could not necessarily play, it allowed performance of music with a great deal of control that is not always possible in a live situation and it appeared to have a positive effect on motivation with students wanting to improve their skills in composition (Pitts & Kwami, 2002).

Byrne and MacDonald (2002) examined the use of ICT in the Scottish Music Curriculum. In their study, they describe working with a focus group of music teachers, and from the teachers' responses to a range of open-ended questions, they identified two themes. The first concerned what was taught in the classroom and how it was taught. The second was more concerned with the management of the teaching and learning environment and the infrastructure supporting it.

In their study, Byrne and MacDonald (2002) made specific reference to how the teachers they worked with described ICT enhancing performance and composition in the classroom. Teachers described how good quality backing tracks could enhance class performance as the technology allowed students to hear tracks that were very similar to what they would hear outside the classroom. The teachers described the 'authentic' sounds that such technology could provide. The teachers said that often a good experience with such tracks could often provide real momentum in the classroom and students were often more motivated to participate in a full range of musical activities as a result.

As in the previous studies, the teachers here also described technology having a significant impact on teaching composition (Pitts & Kwami, 2002). These teachers described how using notation software seemed to 'connect' the notes to sounds providing an 'immediacy' of the work that traditional pen and paper approaches could not provide. They spoke of how they felt students' work was of a higher quality as they had greater resources available to them because of what notation and sequencing software allowed them to do. Students could try a wider range of sounds for a particular piece and then select and save what they felt was the best for the piece. The teachers also discussed the motivation factor that appeared to come as a result of using technology. The teachers described students as 'wanting to do more' and

working better on their own as they were receiving immediate feedback from their 'electronic partner'. The teachers suggested that students were able to develop their work with ease using a cut and paste approach that made the whole composition process quicker. Further comments included a greater level of self-directed and peer-supported learning. Finally, the teachers said that in their experience, many students who had resisted composition work delivered in a traditional manner appeared to far more interested when they were able to work with the computer and work in a style or genre in which they were familiar.

The second theme that Byrne and MacDonald (2002) identified as a result of their study concerned management and infrastructure. The teachers involved in the study said that they felt that in many cases, the students were more familiar with the software than they were and that it was very important for teachers to have the time and opportunity to learn how to use technology, in particular some of the software, before starting activities using it with the students. They also indicated that they felt specialist support was necessary as both they and their students found it incredibly frustrating when things did not work or students' work was lost when software crashed. A further issue was that of resourcing and related costs. All the teachers involved in the study were clear that they would like to be able to have fast computers loaded with the latest versions of software but often money for ICT appeared to going to other areas of the school and often they were provided 'hand-me-down' machines that ran slowly, once again causing frustration to them and their students. The teachers also referred to internet access being an issue. In schools where it was available, often filtering software on the school's network system did not allow them to access website such as YouTube. Many of the teachers were aware of the potential

YouTube had of bringing real-life examples of performances directly into the classroom.

In their conclusions, Byrne and MacDonald (2002) argue that ICT is a powerful teaching and learning tool in the music classroom, an aid to individual learning and can be a strong motivational force in many activities but in particular in composition. They suggest that there are a number of real benefits for students and that the teachers they worked with were very happy to continue to develop their teaching to incorporate ICT in order to reach as many students as possible (Byrne & MacDonald, 2002).

3.4 Recent Studies into Digital Technology in Music Education

Newer technologies appear to be transforming approaches to teaching and learning in primary and secondary schools. Their adoption is part of a much larger social and cultural change driven by the arrival of digital technologies (Savage, 2007). In his 2010 paper, Savage published findings from a research project undertaken through 2007–2008 that are highly relevant to this study. He suggests that the connections between wider technological changes in musical production and consumption and their impact on educational practice have seldom been explored. Following a review of similar relevant literature as described earlier in this chapter, Savage identifies one key finding; teachers *are* using technologies for teaching music from early school years but the practices were limited and often related to the underpinning of traditional values associated with musical performance and composition (Savage, 2010).

Savage (2010) then describes two recent important publications in the UK that have explored the application of technology to the teaching and learning of music within the school curriculum. The first study, funded by the Training and

Development Agency for Schools (TDA), explored how students learn about music using new technologies and the second, OFSTED's (2009) triennial report into the state of music education in the UK, focused on how the introduction of new technologies affects the teacher's pedagogical approach.

The TDA study of 12 schools provided a number of findings, the most important are summarised as follows. Despite the wide and significant cultural changes, music education within the classroom is predominantly technologically conservative. Basic use of ICT for sequencing and score writing dominated teachers' work. Teachers believed that they were more successful in their teaching with ICT as the students grew older. Teachers could judge 'success' with music technology when it reinforced a traditional approach to music education. Many teachers commented that using ICT, in some senses, was similar and in other senses quite different to teaching without ICT. Music teachers work in a resource-rich teaching environment containing a range of instruments and equipment. Lessons are developed to meet the needs of a diverse group of students and teachers are used to managing group work. The adoption and adaptation of pieces of technology often become just another tool in a wide range of potential resources, and these models of working are easily transferable.

As technologies permeated more deeply, pedagogical approaches needed to develop more radically. Where a school had invested in a high level of technology, teachers had to develop their skills to be able to use it effectively and often this resulted in a significant change in their approach if they were to support their students.

The second report Savage (2010) refers to is OFSTED's (2009) triennial report into the state of music education in the UK. Although not primarily focusing on

the use of ICT as such, this report is very relevant as it offers glimpses of what was occurring in UK schools between September 2005 and July 2008 in 84 primary schools and 95 secondary schools. Savage states that this report consolidates much of what was found in the research described above. Firstly, the conservative nature of music education is highlighted and OFSTED identifies that as technology is changing so rapidly, students may be faced with digital technology in schools that appears out-dated to them as teachers struggle to keep pace and develop suitable resources. Secondly, OFSTED reported that in many schools ICT was seen as only suitable for older students, in the UK they refer again to post-Key Stage 3. It would seem that from their observations teachers reserve ICT use for older students and use it to reinforce traditional music education approaches (Savage, 2010).

Savage's (2007) own research shows that despite widespread and significant cultural changes, music education in the classroom is still predominantly technologically conservative. Seven years on from Mills and Murray (2000), it seems that ICT use in music education has not developed in line with performing artists working with similar technology and that basic uses of ICT remain with sequencing and score notation dominating much of the teachers' work. Savage suggests that the prescriptive nature of the curriculum and Attainment Targets at Key Stage 3 in England tends to limit exploration of the potential of technology and that teachers tend to do more interesting things at Key Stage 4 and post-16. He suggests that OFSTED seem to judge success with music technology when it reinforces a traditional approach to music education. 'Sound pictures and collages' are useful only as a precursor to 'real' compositional activities in developing melody, rhythm and harmony and variation as dictated in examination specifications (OFSTED, 2009).

Savage (2010) suggests that there can be little doubt that the use of technology in music has had a profound impact on musicians and their conceptualisation of musical practice. However, he argues that this change in the wider musical world has not been reflected in classroom music. Current examination requirements in the UK show that the musical outcomes facilitated through pieces of technology are not valued as highly by many exam board examiners as those traditional skills that form part of the Western classical traditions. Savage says that our Western music education system has been rooted in traditional beliefs and values towards the production of musical sounds linked with musical instruments and the ability to play them well. Learning to play a musical instrument and controlling its sound to match the requirements of a particular score or the constraints of a particular genre has been the predominate goal. The majority of music teachers involved in his research appeared to be keen to maintain this dimension of music education.

Savage (2010) states that digital technologies have transformed the way music is accessed and owned. 'Digital natives' (Prensky, 2001) have embraced a new world of composition and performance, empowered by new instruments, both real and virtual, that democratise performance and compositional processes in ways unimaginable 10 years ago. Savage says that these changes are slowly filtering through to the conservative music practices in school classrooms.

Similar transformations in relation to matters of effective pedagogy and effective teaching with ICT are occurring in other subjects (Hennessy, Ruthven & Brindley, 2005; Somekh, 2006; Somekh & Lewin, 2009). Savage (2010) argues that teachers need to recognise that using ICT in music education has the potential to transform the nature of the subject itself as well as the way it is taught. Currently, they have been slow to adopt new uses of music technology and typical uses lean towards

the underpinning of traditional approaches to music education rather than revolutionising them. He believes that music teachers and those undertaking initial teacher education in music have to develop a clear understanding of what constitutes effective music teaching with ICT. In his opinion, if educators fail to grasp with major cultural shift, music as a curriculum subject will become increasingly alienated from young people's lives and they will find their music education elsewhere (Savage, 2010).

3.4.1 Web-based collaboration.

Burnard (2007) describes a growing body of research into how teachers define and discuss the enhancement of their pedagogical repertoires through the use on online collaborative technologies in music teaching. If it is possible for teachers to radically change how they teach, then coming to new understandings of how creativity and technology can mediate the learning environment as creative spaces in which pupils (and teachers) learn collaboratively, is crucial. She suggests that we need to take account of *how* these environments conform to the learner and *what* role is played in the complementary recasting of home and school use of music technology (Burnard, 2007).

In the internet age, the situation of childhood and youth cultures is changing, as is the balance between school and family. These factors are influencing the contexts in which teachers work, how we conceive teaching, and how we conceive ourselves as teachers (Burnard, 2008b). She believes secondary school music is at a crossroads. To frame change in the music curriculum, secondary teachers need to think about the conditions of new technology and creativity and consider how the dilemmas of the job can be addressed within collaborative working environments where colleagues learn from each other (Burnard, 2008a).

3.5 The Case for Popular Music in the Schools

The role of popular music in formal music education has proved both challenging and problematic since the 1960s. Music educators around the world have been aware of the need to use popular music as a way of connecting with their students but often lack the skills and experience to be able to incorporate it effectively into what they offer in their classes (Cutietta, 2007; Davis, 2005; Dunbar-Hall & Wemyss, 2000b; Emmons, 2004; Estrella, 2005; Lamont, Hargreaves, Marshall & Tarrant, 2003; Odam, 2004; Rodriguez, 2004; Spruce, 2004). Green (2006) describes the classroom as 'a notorious site for the entanglement of musical meanings, values and experiences' (p. 101). In some cases, she argues, popular music has been included in programmes to pander to students' tastes, in a hope that they will develop an interest in something more worthwhile (such as classical music).

Green's (2006) theoretical position with relation to musical meaning is based on two aspects, which exist in a dialectical relationship. The first concept she refers to is the *inherent* meaning in music where the materials that are inherent in music, such as sound and silence. These, she suggests, can be thought of a part of the musical syntax of a piece and inherent musical meanings can be made out of the materials of music through exposure to formal or informal music and musical activities. The second concept she describes is *delineated* meaning. This refers to 'the extra-musical concepts or connotations that music carries, i.e. its social, cultural, religious, political or other such associations' (p. 102). All music, she suggests, carries form of delineated meaning coming not only from the original context of production, but also from its contexts of distribution and reception (Green, 2006).

According to Green, we are able experience positive or negative responses to either inherent or delineated meanings. Positive responses to inherent meanings occur

when we are familiar with the musical syntax, positive responses to delineations occur when the delineations correspond with issues about which we feel good. The opposite can occur too and this, she suggests, may explain the difficulties many music educators experience when confronted with music that their students identify with and with the responses students may have to music (often classical music) that they play them. The inherent meanings are alien to students because they are not familiar with the musical syntax and the delineated meanings may be negative as they associate classical music with 'old people', 'posh people' or 'snobs' (Green, 2006 p. 103).

In the post-WWII period, Green (2006) argues, it was unthinkable to bring popular music, jazz or any other vernacular form into the classroom in the UK, the US, Australia and other countries in which a Western style of music education prevailed because of the delineations associated with it. These included then, and are still relevant now, issues around teenage rebellion, sexuality, drugs and so on. Students were educated in Western classical music or folk music through listening and singing. Thus, she says, they were expected to study music with whose delineations they largely had no point of identification.

When considering the inherent meaning in music, Green (2006) suggests students tend to be unfamiliar with the inherent meanings in classical and folk music. This occurs because for many these styles of music have taken on 'the mantle of museum culture' (p. 104). As such, listening to classical and/or folk music is simply not part of the cultural practices of most school students and without repeated listening, stylistic familiarity cannot develop, and without some stylistic familiarity, positive experience of inherent meanings is unlikely to occur.

As a result of the growing awareness of a developing alienation in the classroom, educators began to introduce music that students were expected to

welcome. Popular music, jazz and ‘world music’ were accepted into the curriculum slowly from the end of the 1960s until the formal inclusion within a number of countries towards the end of the century. One serious challenge remains though. Despite the best intention of many music teachers to include the latest popular song, the musical tastes of students can change very quickly. The music of The Beatles is considered classical by many of the students in music classes today. Unfortunately for Green (2006), many of the curriculum documents require analysis of popular music using elements and terms often associated with Western classical music. In doing so, one possible outcome is students start to see such pieces as ‘classical’ when studied in this manner at school.

For many students, Green (2001, 2006, 2008) argues, one of the most crucial delineations transmitted by popular music is that its musicians acquire their skills without the benefit of any formal music education. Green (2006) suggests that ‘it has been a central part of musical ideology, from rock to hip hop, soul to reggae, that the music is a direct, unmediated and natural expression of feeling, untrammelled by the dictates of convention and arising naturally from the ‘soul’ of the musicians’ (p. 106). While some popular musicians take formal lessons and may have degrees in popular music, all popular musicians must engage in informal learning practices that differ greatly from the ways in which classical music skills and knowledge have been acquired and transmitted, at least over the last two centuries (Green, 2001, 2006).

3.5.1 Popular music in schools in the US.

In many countries around the world, the increasing gap between what is taught by many educators and schools, and what the students’ experience of music really is, has become increasingly wider in the last 20 years. This gap between conventional

music curricula in the US and musical practices in everyday life is demonstrated with the following quotation from Daniel Cavicchi (1998):

> I would think that it is safe to say that the steadfast school music rituals of singing folk songs in unison, learning music notation, and playing an instrument in a marching band are quite removed from most students' musical lives, not only in terms of genre and style but also in terms of defining what 'music' is supposed to be about. If outside of school a student's musical life mainly consists of trading MP3 files of obscure emo and grunge songs on his computer or dancing with friends at an all-ages club, then a music class where he studies how to play the clarinet is going to seem incredibly bizarre (p.135)

Bowman (2004) argues that in the US, the music education community's increasing obsession with advocacy is a clear reflection of the trend that formal, institutional music studies and actual music practices appear to have parted ways. This advocacy, he argues, is necessary to justify instructional practices whose meaning and relevance are apparent neither to those who they are intended for nor to those who provide financial support. Bowman reminds us that music still occupies vast amounts of people's time and expendable income and it plays a constitutive role in vast ranges of daily activities. He believes that something is amiss in the way music education is conceived, for where people find meaning and value in what they do, there is seldom a need to convince them of the importance of becoming more proficient or knowledgeable about it. Bowman says the significance of these observations is twofold. Firstly, you cannot ignore the inertia in the current school system and the institutions it serves, as it is a powerful force. Secondly, you cannot include popular music in the curriculum without radically reforming the way it is conceived. Bowman argues that a serious and thoughtful commitment to popular

music in music education would change a vast number of things with curriculum content by no means the least of them. If, as he suggests, popular music's meaning and identity are fundamentally unsettled, a music education that takes such music seriously cannot avoid unsettledness itself. From his perspective, a number of questions arise from this. Is music education more concerned with cultural preservation or with cultural transformation? To what extent are cultural values and ideological struggles appropriately addressed within musical education? Are educational institutions able to study without distortion musical practices that can be rebellious, coarse, and at times deliberately offensive? Can musical practices in which individuality, creativity and rapid change feature so strongly be accommodated in schools that are on many levels opposed to these concepts?

Beginning teachers in the US are well prepared to provide experiences in choir, band, orchestra and general music from a Western art music tradition; however, this training may not be enough to motivate the vast majority of students in today's schools (Emmons, 2004). Emmons says that the majority of children love to participate in active music making both in and out of school. The music that they most fully experience is the music that they enjoy the most. He argues that to meet the needs of current students as well as students in future generations, music teachers may need to re-think their roles. Emmons suggests a more student-centred approach may be more appropriate coupled with skills enabling teachers to work with individuals, not just ensembles. In the US, where music education has been traditionally tied to ensemble work such as wind band or choir, this could prove to be quite a challenge.

Emmons (2004) suggests that beginning music teachers should try to learn some of the informal learning techniques employed by many popular music musicians such as *record copy* where often highly sophisticated aural skills are employed to

learn a song by ear without using traditional music notation. He believes that young teachers need to have good skills in using technology to support the work they are doing.

He offers a range of skills he suggests beginning music teachers could use with their students. These include helping students form their own bands and helping them by selecting suitable songs to perform. The teacher could help them with their aural skills so they can copy parts they have heard on a record on their instrument, assign vocal parts in the band and show them riffs and chord progression to enable them to write their own songs. The teacher could offer them specialised tutorials in order to develop improvisational skills within the band, provide help with setting up amplifiers and Public Address (PA) systems thus supporting them in public performances. The teacher could ensure suitable software was available to the students so they can record their songs on laptop or desktop computers.

Finally, the teacher could help them assess their performances and offer suggestions for improvement based on negotiated and agreed criteria involving all the students in their class.

3.5.2 Popular music in schools in the UK.

Odam (2004) suggests that the development of the personal computer in 1979 heralded the beginning of exponential change in people's lives and has required considerable adjustment in a range of areas for many people. Home and workplace technology, he argues, have fundamentally changed, and access to knowledge, lifelong learning and creativity are only just starting to make a mark. Odam believes that adapting to new learning and the ability to adapt and change our skills throughout our lives is now paramount. These developments affect music education as much as

any discipline and the demands of new technology have very much affected the new musician.

Odam (2004) describes two effects that he believes new technology has had on music education and practice. The first is a switch from high-level skills in notation reading and interpretation to aurally based skills of memory and discrimination. Notation is becoming one method of music preservation that produces certain results in certain types of music and has no function in others. The second is the computer has given rise to the musician who has no traditional musical instrument performance skills, neither reads or writes musical notation but can invent and perform new music that communicates directly with its audience through recorded or live presentations. Traditional musical instruments are after all, according to Odam, older technology.

Popular music should be considered a vital part of the music curriculum to which all children have access and with which all children are encouraged to learn (Spruce, 2004). Spruce argues it should be fully integrated into the music curriculum and not isolated into modules or units on which it appears unrelated to other styles of music. Negative messages about its relative value *vis-à-vis* other styles of music should not be articulated, either overtly or subliminally. It should be part of a range of music of different styles and cultures of which children develop an awareness, through performing, composing, listening and appraising. Spruce says students should be taught using popular music and not simply about popular music. Students should be enabled to develop specific and particular criteria that might be employed in evaluating pop music. He believes students need to be helped to develop an awareness of the distinction between musical and extra-musical criteria, how these affect each other, and how they specifically relate to pop music (Spruce, 2004).

3.5.3 Popular music in schools in Finland.

Relevant literature from Finland suggests that music teachers feel a need to defend the amount of popular music within schools (Westerlund, 2006; Vakeva, 2006). In Finnish schools, microphones, drums, guitars and keyboards are the most common types of instruments in music classes even though the national curriculum does not specifically require popular music to be included in music education (Westerlund, 2006). The curriculum for music teachers in the Sibelius Academy requires that teachers display competence in the use of instruments commonly used with pop and rock music; a knowledge of studio techniques, making arrangements in different popular styles and on-stage performance. Despite the emergence of pop culture in Finnish schools and music teacher education, Westerlund says that there is no research on how teaching and learning take place in pop bands in Finnish formal music education.

Westerlund outlines the apprenticeship tradition as one based on hands-on knowledge, know-how or skill and that acquisition of practical know-how takes place through modelling, demonstration, imitation and application. In this tradition, the master teacher knows the goals and how they should be attained. The apprentice first learns the simplest parts of the trade or occupation and then moves on to more complex and skilled aspects. In the apprenticeship model of teaching, the teacher is the initiator and verifier of the activity and the overarching element of the process in this tradition is control.

Green's research (2001, 2008) showed that popular musicians disliked the approach from classical instrument teachers showing how alienating the controlled, progressively proceeding approach can be. Green found for many of them, it took too long to produce anything that sounded like music, it had been broken down into

elements that were meant to ease the learning but that at the same time meant nothing. The situated learning theorists have looked at this common near-sightedness approach in which experts isolate learning processes from their real-life connections and persuade us to change our perspectives.

Participation in real-life tasks, Westerlund (2006) argues, becomes the motivation for learning. As Green's research (2001, 2006, 2008) shows, popular music bands represent social contexts where making music and learning music for real-life purposes, and experiencing the instant use value of participation are intermingled in a motivating way. Musical activity is connected to a larger activity system, community and culture. Teachers in music teacher education in Finland who have had a rock band background have a very different view of learning. In their world of learning, formal exams are easily converted into gigs in bars, and predefined materials into students' own transcriptions, arrangement and compositions.

Westerlund (2006) suggests that in the light of educational theories and practical examples, there are sound reasons to think that popular music practices can show music educators how to create knowledge-building communities and expert culture. She suggests that university environments should encourage peer-directed learning and students' own, real-life projects.

3.6 ICT and Composition

Researchers studying the process of composition often struggle to define what the process of composing actually is and when this process begins. Across a range of studies, some writers differentiate between composing and improvising where others do not. However, most consider composing a process of thinking in sound (Wiggins, 2007). Wiggins suggests that the process of creation of original music is the generally agreed description of composing and/or improvising.

At the centre of any discourse surrounding the process of composition is the question of notation. As described above, Wiggins (2007) has explored the notion of composition being a process of creative thinking and musical thinking. Wiggins argues that most musicians consider that engaging in any musical process involves hearing of conceiving of music in one's mind. Wiggins describes the process of notation as setting a framework, which can present a composer with possibilities as a tool for remembering music or learning music systems. It can also bring limitations as it confines sounds to options that can be expressed in symbols and in doing so, it may result in notation not appropriate for all music (Lilliestam, 1996). Wiggins (2007) refers to Lilliestam's (1996) early work where he observed students performing music containing contemporary rhythms with high levels of syncopation. However, when they were asked to notate their work, they reverted to creating music simple enough for them to record on paper.

Wiggins (2007) provides a number of suggestions to aid the compositional experiences of students. Firstly, she believes that all people are capable of inventing musical ideas and feels that at some time in their experience of education in music they should have the opportunity to do so. Secondly, she argues that if the process of inventing and organising musical material is linked to conceptualising or 'thinking in sound' (Wiggins, 2007 p. 465), composition exercises should be designed to allow for musical thinking. Putting restrictions on what notes students may use in melodies or what chords they can use with harmony, she believes, could inhibit creativity. Thirdly, music educators need to understand and value the musical knowledge that students bring into the classroom; knowledge, she suggests, that is constructed from a lifetime of musical experience both inside and outside of school, in formal and informal learning contexts. Restrictive practices may again inhibit the creativity of the students.

Finally, she believes that learners engaged in composing need to work in an environment that fosters ownership and agency (Wiggins, 2007).

In a keynote address at the 2003 National Association of Music Educators Conference, Paynter employed a metaphor of a shifting beam of light. In this metaphor he describes most people 'being happy to live out their lives in the light of the established knowledge at the bright centre of the beam, but there will always be a few who feel compelled to move away from that comfortable existence' (Paynter cited in Cain, 2004 p.216). Paynter's metaphor can be applied in understanding how curriculum development happens and he could well be referring to himself as one of the people who moved away from the 'bright centre' and as a result helped shift the focus of the music curriculum.

Carr and Kemmis (1986) provide an overview of curriculum change in education as a whole and make specific reference to change occurring as a result of influential individuals, discontented with the status quo, 'powerfully articulating alternative visions of education' (Carr & Kemmis, 1986 p.18). Cain (2004) describes how the *Creative Music* movement that Paynter helped found formed the basis for the development of a new territory in school music curriculum in the UK. During a period that spanned nearly three decades (approximately 1960–1983), Cain describes how Paynter and members of the York Project helped a generation of teachers in the UK show that children, when freed from having to follow a series of externally imposed rules, could work with the raw materials of sound to create music, just as they created paintings and other art works.

Cain (2004) argues that since the end of the highly influential York Project, the focus of the light described in his address by Paynter has expanded considerably and he suggests that much of this expansion is a direct result of the explosion of

technology now available to teachers and students. In Paynter's time, teachers and students used 'found' sounds or worked with simple classroom percussion instruments. School sound recordings were usually realised using reel-to-reel tape machines where sounds were manipulated using edits created with scissors and sticky tape to splice the magnetic tape. Other resources at the time included a well-regarded music textbook with a full-sized reproduction of a piano keyboard complete with the suggestion that students use this silently to find chords, work out melodies and learn specific pitches.

Comparing the picture just described with modern sampling, sequencing and editing software, USB keyboards and the internet, it is clear that the changes in technology available in the classroom have been considerable (Cain, 2004).

Odam (2000) also makes specific reference to Paynter in the context of his work where he seeks to identify a basis for effective classroom practice when teaching composition. Odam provides a concise background to the teaching of composition in schools and as described earlier in this chapter makes special mention of the fact that surprisingly little had been written on the teaching composition in schools when he was researching this topic. Odam also refers to the books written by the Canadian composer R. Murray Schafer that contained suggestions for creative work in the primary classroom. Odam follows by describing three very influential books published in 1970 that contained suggestions for how creative work could be implemented in the classroom. These were *The Resources of Music* by Mellers (1969), *Experimental Music in Schools* by Dennis (1970) and, the book to which I have also previously referred to, *Sound and Silence* by Paynter and Ashton (1970). Odam (2000) argues that these three books happened to coincide with the release of the Plowden Report (1967), which had a huge impact on primary teaching in the UK

and helped considerably in developing creativity in primary teacher education. As a result, the desirability of developing creativity and encouraging composition in the classroom was introduced throughout the school system at that time.

However, Odam (2000) identifies one major issue that he believed many teachers faced trying to implement the creative suggested by many of the authors described above. Odam contends that for many teachers the biggest challenge they faced was how to balance co-operative learning techniques that encourage groups of children to work with minimum supervision in order to maximise limited resources in a mixed-ability environment with the needs of individual students that could differ dramatically in any one class (Odam, 2000).

In the revision of the General Certificate of Secondary Music (GSCE) in England and Wales in 1987, composing became a dominant and, at the time, quite revolutionary feature. Odam argues that by including composition in the curriculum, music education was now 'brought into the realm of arts education where pupil-centred learning, creative work and problem-solving techniques in other art disciplines had been the norm for decades' (Odam, 2000 p.110).

Odam (2000) identified a major challenge for many music teachers required to teach composition as a result of this new curriculum requirement. Many music teachers lacked any formal training in composition in either their undergraduate degree or in their subsequent initial teacher education and such an activity was often outside of the scope of their music making. As such, he said, many teachers reverted to being highly dependent on a dominant teaching method using small group work methodology.

As a result of his research, Odam (2000) identified a range of strategies and related activities, which he believes could improve creativity in composition in the

classroom. He found that good practice in ICT implementation resulted in remarkable results in composition. He believes all music teachers need to be computer literate to implement emerging digital technologies effectively and it is no longer acceptable to rely on some students knowing more than the teacher does. Further suggestions included abandoning traditional small-group composition activities and, depending on resources, either teach key concepts using a whole-class approach or structure groups carefully to ensure that students work cooperatively and with other students with similar skills and musical interests.

In his final summary, Odam (2000) makes a number of relevant statements concerning the practice of teaching composition. He contends that the development and implementation of ICT in the music classroom is essential for the continuing growth of music education. He makes an interesting comparison between acquiring the language of music and learning another language and places a strong emphasis on starting with an experiential approach first. Grammar and technical matters are important and should be taught at an early stage, but only after the student has experienced them in some form of practical activity. Students, he argues, need to be allowed to compose in the styles and genres that they can identify with and as such, activities related to composition need to be carefully integrated with other musical activities including performance and listening skills.

3.6.1 Amplicative and transformative approaches.

Beckstead (2001) provides another view of how technology may be changing the way music education is delivered in classrooms. In the first part of his paper, he describes how multi-timbral keyboards connected to a computer's sequencing

software via Musical Instrument Digital Interface (MIDI)[3] allow students to record musical ideas directly from the keyboards to the computer's memory as digital data. As a result, the data can be manipulated in number of ways and can then be converted to traditional Western notation. Students are able to compose a work such a string quartet by inputting one part at time and note-by-note if necessary. The computer and associated software and hardware allow a speeding up of the process of composition in way that he describes as amplicative. In other words, the task can be completed with greater efficiency, particularly if the student has only a limited knowledge of notation and string performance practice.

Beckstead (2001) argues that while such traditional activities do have some educational purpose, it could be argued that we may be limiting our use of tools that have the possibility of a transformative role. He makes an interesting comparison referring to John Cage questioning the use of the Theremin in the 1950s. The Theremin is a type of sound controller that converted a person's hand gestures on a three-dimensional plane into voltage-controlled oscillations that were then converted to sound. Cage pointed out with some sadness that performance specialists on the Theremin were recreating Italian Opera arias accompanied by an orchestra. Beckstead suggests that the transformative possibilities of this instrument were never fully realised.

Beckstead (2001) then describes Brian Eno's observation of the use of the modern synthesiser. Initially, the original analogue instruments were able to provide a new generation of sounds for electro-acoustic music but quickly their abilities for sound synthesis was directed in such a way to mimic acoustic instruments. Modern digital synthesisers are difficult to program and most players rely on their ability to

[3] Musical Instrument Digital Interface is an electronic musical instrument industry specification that enables a wide variety of digital musical instruments, computers and other related devices to connect and communicate with one another.

imitate acoustic instruments. One again, Beckstead makes the point that the transformative potential of such instruments appears to have been overlooked by many musicians.

Beckstead (2001) closes by suggesting that MIDI technology has helped students compose music in both the traditional notated form as well as music that could not be performed in the traditional acoustic setting. How teachers employ the technology in either an amplicative or transformative fashion, he argues, is less important than the need for teachers and students to be aware of the limitations of such technology and its potential bias towards traditional skills in composition. Finally, he suggests that teachers should try to look beyond the efficiency of basic technologies and look for ways in which they can re-evaluate and *transform* the process of composition with the aid of technology (Beckstead, 2001).

3.6.2 Studies into computer-based composition.

The increasing impact of media and the technological development of a range of digital devices over the last decade mean that listening to music and creating music constitutes a major and integrated part of many young people's lives. One result of technology is that attitudes towards the creation of music have changed, and are more egalitarian and possibly inclusive. The creation of music may be viewed as something anyone can do and is not seen as reserved only for musical geniuses (Folkestad, Hargreaves & Lindstrom, 1998).

Jeanne Bamberger conducted one of the first studies to investigate the composition process when using computers in 1977. Her focus in this early study was on the decision-making processes in melody writing. Subsequent studies such as one conducted by Kratus in 1985 investigated the developmental nature of children's original compositions with a focus on the creative *products.* A further study by Kratus

in 1989 examined the creative *processes* used by children aged between seven and 11. An important finding from this study was that the act of composition for younger children was very similar to the act of improvisation, whereas the 11 year olds used significantly more development and less exploration of musical ideas.

Folkestad (1991) carried out a two-year study in a secondary school where 12-year-old students worked in groups of three to five to create music of their own using synthesisers and sequencers. The results of this study indicated that the technology available to the students resulted in a change in not only *what* was done but also in *how* it was done with respect to musical content and styles. As a result, two qualitatively different ways of creating music were identified (Folkestad, 1991). These were defined as *supplementary* use, in which the equipment was used as a tool for *arranging* music and *integral* use, in which the equipment was used an 'interactive medium from the very beginning as an *integral part in composition'* (Folkestad et al., 1998 p.85).

Berkley's paper in 2004 reports on a school-based research project into teaching composition at GCSE level. In this study, Berkley focused on some of the approaches taken by teachers in teaching this part of the music curriculum. She describes how students are required to work through 'an invariant series of stages chronologically when making a piece' (Berkley, 2004 p.241). Berkley argues that the process of composition follows the following progression. Firstly, students need to recognise and identify the composing problem, which provides the initial stimulus. Secondly, they must generate and realise initial ideas via logical and opportunistic thought and the manipulation of chosen compositional techniques. Thirdly, they need to create a draft of the piece through developing, revising and modifying existing ideas plus editing sections at a micro level and finally determining the final version of

the piece including testing and rehearsing the complete piece in order to edit the work at a macro level (Berkley, 2004).

Although Berkley's (2004) paper is mostly concerned with the importance that the role of the teacher plays in composition, many of her findings are relevant to the context of this study too. She quite correctly identifies the central role that the teacher plays in the student's development in learning to compose. As discussed earlier, digital technology is now an accepted part of the resources available to a music teacher and many of their pedagogical approaches are concerned with developing successful operation of the software before any creative work takes place. In addition, the role that behavioural objectives derived from the curriculum provided for the subject by the government cannot be underestimated when considering decisions teachers make (Berkley, 2004).

Berkley (2004) states that 'teaching is designed to educate, to nurture, to communicate norms and conventions and to deliver effective learning strategies' (p. 258). She argues that students need to become familiar with both verbal, formal knowledge and non-verbal, informal situated knowledge in composing. Teaching composition should be concerned with creating a balance between the promotion of objective knowledge of theory, technique, rules and conventions and an understanding of the digital technology available to them and the promotion of the student's subjective creativity and ownership (Berkley, 2001, 2004).

A study conducted by Seddon and O'Neill (2003) echoes many of Berkley's (2004) findings as described above. Seddon and O'Neill (2003) explored the creative thinking processes in adolescents and compared the potential differences in approaches between students with and without prior experience of formal instrumental music tuition (FIMT). They referred to Folkestad's (1991) study and

examined the difference that Folkestad described between students with FIMT using available technology in a supplementary manner (for arranging music) and those students without FIMT working with the technology in a more integral manner (using the equipment in an interactive fashion).

As Folkestad (1991) says, adolescents constantly listen to music produced through the use of digital technology and they form impressions of how it may be created, thus he considers there is no such thing as a musically naïve adolescent. The difference between the two cohorts that Seddon and O'Neill (2003) studied was therefore whether they had received FIMT or not. They found that students with prior experience of FIMT were less inclined to explore the possibilities that the technology available to them offered. Students without FIMT appeared to have no pre-conceived ideas about how the composing process should take place and were prepared to explore the possibilities offered by the technology. Seddon and O'Neill suggest that teachers should work to create an atmosphere where students are able to develop their own strategies for composition rather than trying to teach them how to compose. Teachers may have to work to becoming more of a facilitator as opposed to a conveyer of knowledge to allow this to happen (Seddon & O'Neill, 2003).

3.6.3 Case study in a Canadian school: Composition in action.

Bolden (2009) describes a case where he observed a music teacher teaching composition to students in a large urban school in Canada. In this case, Bolden focuses on the tasks and activities the teacher provides for the students and how he supports what he does with the digital technology available to him. Bolden provides a number of themes, the first being described as authentic assignments.

Bolden (2009) says this teacher is very aware of the need for the students to make connections between their work in the classroom and what happens beyond

school. He says that the teacher regularly uses the expression ‘in the real world’ when speaking about the tasks he provides for the students. Typical of these would be a task such as providing a simple soundtrack for a flash animation that may include some form of *sting* (sound effect) for an incident that involves the cartoon character in the animation. Students in this activity are required to use a sequencer to compose the soundtrack and then synchronise that with the animation.

Another activity that Bolden (2009) says is popular with the students is a task where the students are provided with a lead sheet (melody and chords) of the national anthem. The students are then required to create their own arrangement of the anthem, again using a sequencer, and the best ones are played on the school’s broadcasting system at the start of each day. This, the teacher tells Bolden, provides a very concrete task for the students and one to which they respond well. In both examples, Bolden argues that the students are very focused on the tasks as they perceive them as very real and this enhances their creativity.

The second theme Bolden (2009) describes is related to music theory. He says that the teacher involved in his study is very clear that music theory can be a very useful tool for composing. However, the teacher is equally clear that theory and practice must be connected and in his teaching of composition, he uses an experiential approach where practice usually comes first. Bolden describes how the teacher uses ‘teachable moments’ to articulate and describe key theoretical concepts that the students may have discovered by chance. Such a moment is described relating to a rock riff that has a specific tonal centre but the student who created it highlighted a particular note that gave the riff its particular sound or *flavour.* By doing this, Bolden argues, the teacher is able to make the student’s implicit practical knowledge explicit. He continues by saying that through musical exploration the students often develop a

partial, aural knowledge of music on their own. By then deconstructing this and providing further analysis, the teacher is able to help the students understand the concept, in this example, of the difference between a major third and a minor third from a theoretical perspective.

The third theme that Bolden (2009) refers to is what he describes as 'diagnose and fix' (p. 144). One huge advantage that digital technology has over traditional paper and pen composing is the ability students have to try different things with their work without having to re-write their pieces completely. Bolden describes the teacher working with individual students and *tinkering* with their work, adjusting the volume of a specific part in one instance, suggesting that another part is slightly out of sync and so on.

On occasions, he would take a piece that a student had written and would play it to the whole class inviting the other students to comment on what they heard and what they thought the composer could do to improve it. Students with different levels of expertise in different genres would often be asked to help other students develop improved parts if they were working in a genre or style that they were less familiar with. Bolden provides an example where some students who enjoy writing in hip hop styles helped another student develop a specific drum part that he had been struggling with.

As a result of this study, Bolden (2009) provides connections between what he observed this teacher doing and other studies described earlier in this chapter. He makes specific reference to Odam (2000) and the necessity for students to be involved in authentic tasks with concrete deadlines. Bolden's (2009) description of an authentic task is one that connects students compositions to the 'real world' and so can have meaning beyond the music classroom.

Bolden (2009) also refers to Berkley (2004) and how, in her study, she categorises the approaches teachers take to teaching composition. She argues that some teachers have a very formal approach in which they insist students have a good understanding of music theory, some have a semi-formal approach in which some form of practical exercise comes first but it is related directly to theoretical concepts; and finally some have an informal approach in which students are allowed to work in their own way, in their own style and in their own time. In his study, Bolden (2009) suggest that the teacher he observed tended to work in a semi-formal to informal manner. He still believes in the importance of music theory: that knowledge of theory can allow a higher level of compositional skill but the key is to connect the theory directly to practice.

3.7 Summary

In this chapter, the literature review located some of the important issues pertaining to the use of digital technology in music education in three specific areas. The first part of the chapter examined some of the body of research surrounding the early introduction of ICT into music education. Here, I described the move from traditional instruction and 'drill and practice' approaches that used technology to support traditional activities to the more student-centred approaches that can be supported with more powerful technologies resulting in more realistic tasks and activities relevant to the world in which students now live. I followed this with a short exploration of relevant literature pertaining to the use of technology in performance and to aid creativity followed by an examination of technology use in composition pre-2000.

The next section examined three important studies into the use of technology in music education early in the new millennium. Each study comes from a slightly

different perspective with one focusing on good teaching, the second on how teachers were using technology to aid composition and the third on how technology was being used to meet curriculum requirements. All showed how teachers were starting to come to terms with utilising technology in a range of activities in the classroom. This was followed by a very relevant recent study to see how teachers are using technology seven years on from these important early studies and included a brief discussion on how teachers could work collaboratively via the internet to improve their teaching.

The section on popular music in schools showed how music educators in the US, England and Finland are coming to terms with introducing popular music into the classroom. Of specific relevance to this study are indications that technology is something that students can use to create music more relevant to their own lives and experiences without the formal music training and skills often seen as important by their teachers.

The final section focused on studies exploring the use of technology in composition in the new millennium. Included here were suggestions for how teachers may be able to use technology to develop new ways of approaching music education in the classroom and explores the dichotomy of an amplicative approach to tasks using technology and the transformative potential technology may offer teachers. The last section provided a description of how one teacher uses digital technology in a high school to help his students achieve in composition tasks. This description showed how a teacher is able to use an experiential approach and a ‘semi-formal’ style of teaching to engage students in authentic tasks while at the same time drawing their attention to traditional theoretical concepts where appropriate.

In the review of literature, researchers and writers have described in some depth many of the ways that teachers have implemented technology in a range of

activities in the classroom. However, there is comparatively little literature exploring how students perceive the use of technology in activities that they are involved with in the music room. While many researchers report on student achievement as measured against specific curriculum requirements, there appears to be few examples in the published literature where researchers ask the students how they perceive the effectiveness of technology in activities in the music room. In other words, the voice of the students remains distant and often relatively indistinct.

The literature discussed in this and the other two previous chapters has served to paint a picture of a context where, according to Cain (2004), 'curriculum change is necessary if the world of the classroom is going to keep pace with the world outside' (p. 219).

Burnard (2007) suggests that a universal aspiration for all music educators is to improve the quality of musical learning and its relevance to the young learner. As such, she suggests that we need to consider carefully if a music teacher's capacity to use technology effectively matches the educational needs of his or her students. The review of the literature helped indicate the context in which the present study has been undertaken. It also identified a number of issues that have helped inform the basis of this study.

The present study into the work of nine experienced New Zealand music teachers in four schools closely investigates their pedagogical practice, as well as their perceptions and experience using digital technology as music educators within the New Zealand educational policy and curriculum environment. The study also investigates the perception and the experiences of some of their students in the same environment. A detailed explanation of the methodological approach to this study is now presented in Chapter 4.

Chapter 4: Methodology and Research Design

This chapter describes the research methodology and design of this project, which uses a predominantly qualitative approach to gather data. It explains decisions I made regarding the methodological approaches I believe were best in order to gather rich data. It shows how I have employed a combination of approaches to data gathering including using teacher and student surveys in order to gather some descriptive numerical data that informed further, more in-depth, qualitative investigations. It explains how the research design decisions have been made to ensure rigour and validity. It also explores the concept of reflexivity as part of the discussion surrounding rigour and validity. The chapter begins by briefly describing the context of research in music education and the various methodological approaches researchers have taken over the years. I will then locate the design within the interpretive research paradigm using case study methodology. The data collection and analysis processes are explained, along with the ethical implications and measures taken to safeguard the participants.

4.1 Research in Music Education

Research in music education covers a wide range of activities and can be concerned with, among other topics, any of the following: individual music development, the potential of music learning to enhance social group membership, inclusion and participation, schooling, creativity and new technologies, formal and informal learning, artist–educator partnerships and school–university partnerships (Burnard, 2006). The goal of research in music should be a product that contributes to knowledge about music and musical behaviour (Yarbrough, 1996).

Much early research in music education utilised quantitative methodologies. Much of the work undertaken in the middle of the twentieth century was concerned

with *drill and practise* activities often to do with pitch discrimination, the ability of a subject to recognise rhythm and/or chord progressions and the like. Most research tended to focus on an examination of how it might be possible to predict levels of musical ability. Researchers in the 1940s through to the 1980s were concerned with improvements in design, number of subjects and data analysis (Roulston, 2006). However, since that time, there has been a significant increase in the number of qualitative approaches emerging in music education research. Yarbrough (1996) wrote:

> Qualitative research methodology may be defined as that which is based on context sensitivity. Researchers using this methodology believe that the particular physical, historical, material and social environment in which people find themselves have great bearing on what they think and how they act. Therefore, techniques for conducting research include, for example, anecdotal accounts, interviews, perusal of materials, transcriptions of musical responses and demographic information (p. 192).

Yarbrough (1996) argues that researchers in areas of music education needed to broaden their approach and work at developing a range of interdisciplinary knowledge and skills. She suggests that researchers working in the field of music education should explore some areas of scientific methodology coupled with strong orientations in the humanities and liberal arts, as this combination should provide rich data that has been collected with sufficient rigour while also including the necessary contextual location (Yarbrough, 1996).

It is important that researchers in music education clearly articulate the research questions that guide the enquiry. Burnard (2006) argues that future research in this area ‘would be enhanced if researchers explicitly mapped out their

assumptions, their theories of action and their research processes including the "what", "how" and "why" of methods and methodologies as distinct but interrelated dimensions' (p. 149). It is the clarity of justification, she argues, and the detailed explanation and description by the researcher that allows judgements of validity to be made by the reader. This chapter outlines the methodology, methods, theories of action, and epistemological and ontological underpinnings that support work undertaken in this research project.

4.2 Interpretive Research Paradigm

The interpretive research paradigm can be described as an examination of the processes and the lived experience of participants in a particular environment such as schools. Understanding the meaning of the process or the experience constitutes the knowledge to be gained from an inductive mode as opposed to a deductive or testing mode of inquiry. Multiple realities can be constructed socially by individuals (Merriam, 1998). Qualitative research procedures are based on theoretical assumptions that meaning and processes are crucial in understanding human behaviour, that descriptive data are what is important to collect and that analysis is best done inductively (Bogdan & Biklen, 2007). Within interpretive social science, there is an assumption that reality is constructed through social interactions, and is therefore fluid and dynamic rather than a stable entity waiting to be discovered. An interpretive research methodology recognises that the complexity of the whole cannot be understood by studying its components, but that relationships, personal factors and context are critical. Meaning is a socially constructed phenomenon, which exists through processes of communication and negotiation and meaning is open to multiple perspectives and interpretations (Neuman, 2003). The purpose of interpretive social science and the intent of this study are not to generalise to larger populations. The

purpose here is to examine perceptions of a small group of teachers and a larger group of students regarding the use of digital technology in the secondary music classroom. The value of the research lies in its explication of the processes of students and teachers in this context, and 'to understand the subjective world of human experience' (Cohen & Manion, 1994, p. 36) in this regard.

The subjective nature of interpretive research presents challenges when designing studies such as this one. Merriam (1998) argues that 'all research is concerned with producing valid and reliable knowledge in an ethical manner' (p. 198). Assessing the validity and reliability of a qualitative study involves examining its component parts as in other types of research. Guba and Lincoln (1981) point out that in a quantitative or experimental study you can 'talk about the validity and reliability of the instrumentation, the appropriateness of the data analysis techniques, the degree of relationship between the conclusions drawn and the data upon which they presumably rest and so on' (p. 378). This is no different in a qualitative case study where you could ask were the interviews reliably and validly constructed; was the content of the documents properly analysed; do the conclusions of the case study rest upon data?

Validity and reliability are concerns that can be approached through careful attention to a study's conceptualisation and, according to Merriam (1998), 'the way in which the data are collected, analysed, and interpreted, and the way in which the findings are presented' (p. 200).

4.2.1 Quantitative and qualitative approaches in social research.

Considerable debate has occurred between advocates of quantitative and qualitative research paradigms for more than a century (Johnson & Onwuegbuzie, 2004). Quantitative purists maintain that social science inquiry should be objective

and should be time- and context-free generalisations. Educational researchers should eliminate their biases, remain emotionally detached and uninvolved with the objects of study and test or justify their stated hypothesis in some empirical manner (Johnson & Onwuegbuzie, 2004). Conversely, qualitative purists reject what they refer to as positivism. They argue for the superiority of constructivism, idealism, relativism, humanism, hermeneutics and the like (Guba & Lincoln, 1989). Purists here contend that 'multiple-constructed realities abound, that time- and context-free generalisations are neither desirable nor possible, that it is impossible to differentiate fully between causes and effects and that knower and known cannot be separated because the subjective knower is the only source of reality' (Johnson & Onwuegbuzie, 2004 p.14). Qualitative researchers are interested in understanding the meaning people have constructed, in other words, how they make sense of their world and the experiences they have in that world (Merriam, 1998). A third research paradigm in educational research combining both quantitative and qualitative approaches is described by Johnson and Onweugbuzie (2004). They argue that the goal of mixed-methods research is not to replace either of the approaches described above but rather to 'draw from the strengths and minimise the weaknesses of both' (Johnson & Onweugbuzie, 2004, p. 14). They believe that mixed-methods research offers educational researchers a methodology closer to what researchers actually use in practice.

4.2.2 Rationale for the research methodology.

The research investigated the perceptions of ICT and digital technology of teachers and students in music education at four secondary schools. The purpose of the study was to gain insight into how the teachers and students perceived the usefulness of digital technology in common music education activities, if there was any disjuncture between what the teachers and their students perceived, and what

implications this may have for secondary music teacher education in the future. An important component in this exploration was utilising a methodology that would allow some general generic data to be gathered first. This data could then inform the process of gathering more in-depth data via four separate case studies for subsequent deeper interrogation.

Two questionnaires were developed, one for teachers and one for students. These were informed by relevant literature, which described some exploration of the possible use of ICT, and in particular digital technology in music education. Both questionnaires contained generic questions where respondents were required to rank their perceived usefulness of digital technology in common music activities. The teacher questionnaire also contained a range of open-ended questions that allowed the respondents to provide more in-depth responses to key questions.

As discussed earlier, research in music education initially utilised a range of quantitative methodologies and was often concerned with very specific activities such as analysis of specific drills concerned with the development of specific skills such as pitch identification, recognition of intervals, discrimination of rhythmic patterns and the like. However, since the 1980s, there appears to have been a growth in qualitative approaches where researchers have begun to develop skills in content analysis allowing a greater understanding of the importance of personal experience, context and the social environment in which they find themselves (Yarbrough, 1996). A constructivist perspective guided this research with an underpinning epistemology of subjectivism, whereby ‘the knower and subject create understandings’ (Denzin & Lincoln, 1998, p. 27). Within such a framework ‘there is no single interpretive truth’ (Denzin & Lincoln, 1998, p. 30) but rather, the researcher and the participants construct realities. As Silverman (2003) summarises, ‘the particular strength of

qualitative research, for both researchers and practitioners, is its ability to focus on actual practice in situ, looking at how social interactions are routinely *enacted'* (p. 349) (author's italics). Subjectivism holds that reality does not exist independently from social construction, but rather the nature of anything can only be described in terms of multiple realities dependent on the perspectives of those involved (Creswell, 1998; Guba & Lincoln, 1998).

4.2.3 Case study methodology.

Case study methodology requires that particular social contexts be studied as purposive entities bounded by particular features, patterns, behaviours and/or attributes that invite scrutiny (Stake, 2003). Yin (1994) defines the process of case study as 'an empirical inquiry that investigates a contemporary phenomenon within its real-life context' (p. 13). Merriam (2001, p. 191) argues that case study can refer to 'the process, the unit of study and the end product of research'.

The multi-site case study approach was employed for this research because it enabled a study of four different schools each possessing very different contexts for both the teachers and students involved in the project. Case study methodology accommodates inquiry into the nature, context, components, interrelationships, and complexities of the teachers and students' perceptions and experiences in these contexts. The case study approach is appropriate for understanding processes and the effects of contextual characteristics on a phenomenon (Merriam, 2001). As Cohen and Manion (1994) suggest, case studies may facilitate action because 'they begin in a world of action and contribute to it. Their insights may be directly interpreted and put to use' (p. 123). Understanding the perceptions of teachers and students of the use of ICT and digital technology in music education informs future investigations in this

field and contributes to situated socio-cultural theories of teacher learning and their response such new developments.

The issues, problems and situated complexities of a case are important, and the researcher seeks to establish a rich, holistic description of the naturally occurring features of the case, thus making them accessible to the readers (Cohen & Manion, 1994). As Stake (2003) describes, 'qualitative case researchers orient to complexities connecting ordinary practices in natural habitats to the abstractions and concerns of diverse academic disciplines' (p. 142).

This study connects the perceptions of teachers and students of ICT and digital technologies in the music classroom to the theories surrounding the adoption and adaptation of new technologies. This study has been undertaken in order to better understand the complex affordances, tensions, restraints and processes that affect teachers' choices and students' responses as they negotiate between the boundaries of external requirements, curriculum, students' needs and institutional requirements. Case study facilitates inquiry into the specifics and the intricacies of a particular case, either for its intrinsic worth, or because it may be instrumental in providing insight into issues or phenomena of more general interest (Merriam, 2001; Stake, 2003; Yin, 2009).

4.3 Data Collection

Case studies typically draw on multiple sources of data to capture the richness, complexity and scope of the case and to provide verification of the data (Stake, 1994). Multiple sources enable a convergence of data within the case and strengthen their trustworthiness (Creswell, 2003). Cohen et al. (2000) suggest that a case study provides a unique example of real people in real situations and that it can enable readers to understand how ideas and abstract principles can fit together. A case study

can penetrate situations in ways that are not always susceptible to numerical analysis. A strength of a case study is that it observes effects in context and recognises context as a powerful determinant in both causes and effects. Case studies investigate and report the complex dynamic unfolding of events, human relationships and the factors in a unique instance. Case studies are particularly useful in providing the fine detail in a coarse grain picture provided by associated survey data (Cohen, Mannion & Morrison, 2000). This study used the initial questionnaires to gather data from students and teachers. This data, the 'coarse grain picture', helped shape the questions used in the semi-structured interviews that occurred at each site.

Details of each school comprising each case are summarised in the following figure.

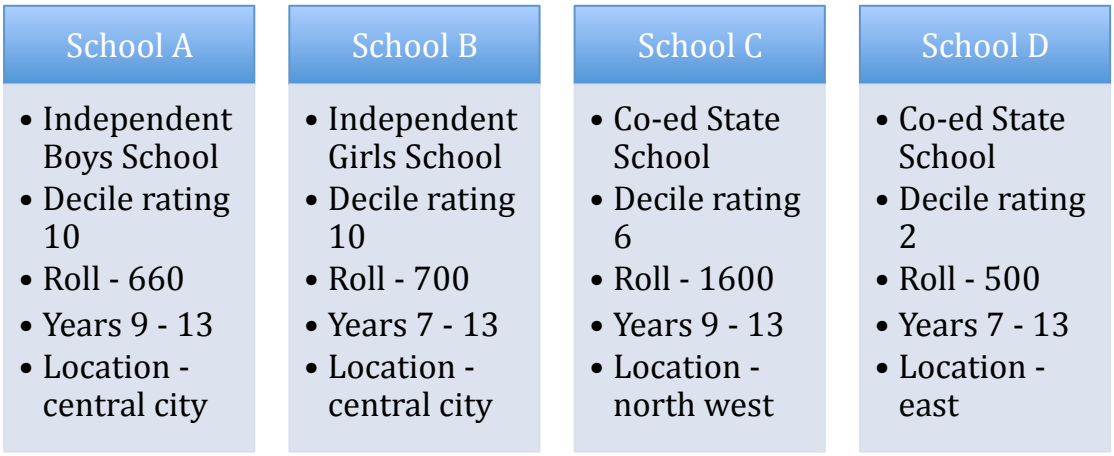

Figure 4.1. Details of the four schools.

As described above, Stake (1994) and Creswell (2003) argue case studies require multiple sources of data to capture the richness, complexity and scope of the case. It was important to gather data from a number of sources in conjunction with the semi-structured interviews that provided the primary source of data in each case. As

Cohen and Manion (1994) suggest, the interview process is open to a range of problems including sources of bias within the interviewer and interviewee, misconceptions about the questions or intent of the interview, misunderstandings about the responses, and the potential for the interviewee to respond in favourable ways. In this study, the questionnaires provided an initial source of data from which the questions for the semi-structured interviews were developed. The teacher questionnaires also contained a series of open-ended questions, which provided respondents the opportunity to comment further on aspects of questions asked previously in the document. These answers provided a good 'benchmark' to verify statements made in the interviews. Further corroboration of data was made via field notes and observations of teacher and student interaction in classrooms in each of the four schools.

Table 4.1 summarises key information on the individual teachers in each of the four schools, while Table 4.2 summarises key information on the students involved in each of the four schools in the study. Table 4.3 summarises the data collection strategies used in this study.

Table 4.1

Summary of Teacher Participants

School	Teacher	Age	Teaching experience	Specialism(s) in degree	Responsibility in school music
A	Mr Organist	41–40 yrs	24–30 yrs	Performance Classical Composition	Choir Composition
	Mr Violinist	41–60 yrs	24–30 yrs	Performance Classical	Orchestra Composition
B	Mrs Conductor	41–40 yrs	21–24 yrs	Performance Classical	Orchestra Composition
	Ms Singer	31–40 yrs	16–20 yrs	General Arts Vocal	Choir Composition
C	Mr Bass Guitarist	31–40 yrs	11–14 yrs	Performance Jazz, Rock	Rock, Jazz Composition
	Mr Brass	41–60 yrs	24–30 yrs	General Arts	Assistant Composition
D	Ms Saxophonist	31–40 yrs	11–14 yrs	Performance Jazz, Rock	Jazz, Rock, Concert Bands
	Mr Drummer	31–40 yrs	11–14 yrs	Performance Jazz, Rock	Rock Composition
	Mr Guitarist	21–30 yrs	6–10 yrs	Performance Jazz, Rock Composition	Rock, Jazz Composition

Table 4.2

Summary of Student Participants

School	Questionnaire responses	Gender	Average age	Focus group	Gender
A	n = 89	M = 89	14 yrs	n = 6	M = 6
B	n = 33	F = 33	13.4 yrs	n = 7	F = 7
C	n = 46	M = 33 F = 14	14 yrs	n = 6	M = 3 F = 3
D	n = 13	M = 8 F = 4	14 yrs	n = 5	M = 3 F = 2

The four schools were deliberately chosen based on my experience as a music educator involved in initial teacher education. Four factors influenced my choice of schools:

1. All of the schools are perceived by the wider community as having flourishing music departments.

2. All of the schools utilise a range of digital technology in their classroom activities.
3. The schools represent a range of socio-economic backgrounds. Schools A and B typically attract students with high socio-economic backgrounds, School C is representative of a typical middle-class school and School D attracts students with predominantly low socio-economic background and has the largest number of Maori and Pasifika students.
4. Each of the schools offers a different mix of activities available to the students. Schools A and B achieve well in national choral competitions. These two schools endeavour to offer as varied a music programme as possible and try to incorporate opportunities for students to work with jazz and rock. School C and School D enjoy a strong reputation for high levels of achievement in jazz and rock in relevant festivals and competitions. School D also achieves highly in specialised competitions, such as Pasifika Beats (Polynesian music) and *kapa haka* (Maori performing arts).

Table 4.3

Overview of Data Collection Strategies

Data source	Data purpose
Official documents	
Education Review Office reports	Background demographic information about participants' schools, including decile ranking, roll, number of teachers, school type
NZ Curriculum (1997)	Statement on learning in the Arts including reference to music–sound arts. Specific reference to strands suggesting activities undertaken in the music classroom
Questionnaires	
Teacher Questionnaires	General information on teacher background, teaching experience, responsibility in school music programme Quantitative information concerning perceptions of usefulness of digital technology in activities as required by curriculum Open-ended written questions requesting more in-depth responses elaborating on information as described above
Student Questionnaires	General information regarding age, gender, computer use with reference to music and digital technology associated with music Quantitative information concerning perceptions of usefulness of digital technology in activities in their music classes
Participant interviews	
Teacher interviews	Semi-structured individual and/or small group interviews exploring emerging understandings generated by data from initial questionnaire responses
Student interviews	Focus group interviews exploring emerging understandings generated by data from initial questionnaire responses
Researcher's notes	
Field notes, classroom observations and journal entries	Recorded the research process, important details, reflections and emerging themes and understandings

4.3.1 Official documents.

Official documents provide data about the regulatory framework and policies of the education system. They are an important source of data. In this research, a key document is the New Zealand Curriculum (Ministry of Education, 2007). In the Arts section, specific reference is made to music–sound arts. The following descriptors

contained in the document refer directly to music being created from natural, acoustic or *digital* (italics by author) sources. In other words, there is a direct reference in the curriculum to creating music via digital technologies. A statement that suggests music education in schools will involve students working 'individually and collaboratively to explore the potential of sounds and technologies for creating, interpreting, and representing music ideas' (Ministry of Education, 2007 p. 21) follows this.

Demographic information about participants' schools was obtained from the Education Review Office (ERO) reports. This information indicated the number of students attending the schools, the number of contributing schools (in the case of School C and School D), the social-economic background of the students, and the current staffing structure of each school. Of particular interest was the ERO report on School D, as it referred to the changing nature of the school due to a considerable roll reduction in the past five years, and indicated some implications for the future development of the school.

4.3.2 Questionnaires.

Two questionnaires were developed for this research. The questions contained in them were developed following an initial exploration of relevant literature surrounding the use of ICT in music education specifically in secondary schools. Of particular interest was exploring the students' experience of digital technologies at home and at school as suggested by Prensky (2005, 2009), Somekh (2006, 2007) and Tapscott (1998, 1999).

The Teacher Questionnaire comprised three sections. The first gathered general data about age, background, teaching experience and specialty in the school music programme. The second asked participants to rank their perception of the usefulness of various digital technologies in common classroom music activities. A

four-point Likert scale was used, 1 being strongly disagree and 4 being strongly agree. The third section contained more open-ended questions that built on their responses from section two.

The Student Questionnaire comprised two sections. The first section was designed to gather some general demographic data and was followed with questions exploring students' use of computers at home and at school with a focus on activities involving music. The second section was nearly identical to the teacher questionnaire and required the students to rank their perceived usefulness of digital technology in common activities in the music classroom via the same Likert scale as described above.

4.3.3 Interviews.

Participant interviews provided the primary source of data and enabled me to explore further teachers and students' perceptions of the usefulness of digital technology in the music classroom. The interviews took place between one and three months after the initial data collection from the questionnaires. This made it possible to explore in-depth the main issues that had emerged following analysis of the questionnaire data. This was important as it provided me time to review the data and identify key questions I wished to explore further in the interviews. In Schools A and D, the teacher interviews were conducted individually. For Schools B and C, the teachers requested to be interviewed together. I was a little surprised at this request, as I would have preferred to have conducted a series of individual interviews. I felt that some of the responses might be overly influenced by the views of the head of department. However, both heads of departments indicated to me that they felt they worked as a team in their respective departments and by being interviewed together, they were going to be able to build on the responses from each other.

The student interviews were always intended to be conducted as group interviews and their music teachers, at my request, selected participants. My intention was to have a mix of students in each group. I requested the music teachers to select students who played traditional orchestral instruments and/or piano and those who had experience playing contemporary instruments and styles such as electric guitar, bass guitar or drums. At Schools C and D, I also requested the teachers provide a group of participants that had a mix of gender as well.

Merriam (1998) describes interviews as being one of the most common forms of data collection in qualitative research. She suggests that the main purpose of an interview is to obtain 'a special kind of information' (p. 71). Semi-structured interviews were employed using a clear questioning schedule. This provided a coherent and consistent framework to the interviews, both for students and teachers. The teachers interviewed were able to view the questions before the interview took place. However, while all the interviews employed the same schedule of questions, care was taken to ensure the interviews were responsive to participants' experiences, allowing the teachers to express their perspectives, rather than being tightly constrained by pre-determined questions (Bogdan & Biklen, 2007).

The student group interviews were conducted in a similar manner employing a schedule of questions. In these interviews, a pre-interview explanation took place to help contextualise the interview and explain that in a semi-structured interview the intention was to try to make it as much as possible a conversation and discussion rather than requiring *correct answers* to any questions that were asked. This approach was adopted to help establish a relationship of trust and respect with the participants, thus minimising the observer effect where participants consciously or unconsciously try to impress the researcher (Bogdan & Biklen, 2007).

The teacher interviews typically took 30 to 40 minutes to conduct. In Schools A, B and D, they were conducted in the teachers' offices. In School C, the interview was conducted in a temporary classroom as the music suite was being renovated at the time. All interviews were recorded on a digital recorder and the files were then stored electronically for later transcription and subsequent analysis.

The student interviews were conducted between six to nine months after the initial data collection from the questionnaires. In Schools B, C and D, the interviews were conducted during class time in a classroom next to the students' usual music classroom. In School A, the interview was conducted in the Director of Music's office.

All interviews were again recorded on a digital recorder and the files then transferred electronically for transcription and subsequent analysis.

4.3.3 Researcher field notes and observations.

My personal records of the research project evolved with the study and provided a valuable source of information. I kept quite detailed field notes at the start of the project. In these, I included notes on observations of teacher and student interactions in the classroom, particularly if I observed activities that involved the use of some form of digital technology. After each meeting with the teachers involved in the study, I would write some form of reflection, which included ideas or issues to discuss with the teachers next time we met. Of particular interest to me were the serendipitous moments where teachers would suddenly become very enthused about something students had written using digital technology and in Schools B and D, the teachers took me to observe students working with digital technology to show me what they were doing at the time. Such opportunities proved to be very valuable when working to triangulate data during the analysis phase.

4.4 Data Management and Analysis

4.4.1 Use of software.

Due to some financial support received for this project, I was able to employ an administrative assistant who entered all data from the four cases into an Excel spreadsheet. A simple numerical coding system was devised after some discussion between the assistant and myself. The same numerical system was employed on the teacher data and student data for the generic questions requiring ranking of the perceived usefulness of digital technology in the main activities in the classroom.

As a result of the small sample of teacher data (n = 9), no formulas were employed to generate percentages. With the student questionnaires (n = 182), a simple formula was used to generate percentage responses within each of these categories. Data here were aggregated for all the students in the four cases and aggregated via gender.

After completing each interview, I transferred the file from the digital recorder and stored it electronically. Saving the interviews digitally allowed simple manipulation of the files where it was easy to review sections of interest. I listened to each interview again while examining my field notes taken at the time of the interview. Further notes were made highlighting specific points of interest that could be used when coding the interview data. Once again, the financial support I received for this project allowed me to employ another administrative assistant who transcribed all of the interviews. The transcriptions were sent back to me and the transcriptions were checked carefully for accuracy and one or two changes were required, particularly concerning specific musical terminology. Copies of the transcriptions were then sent back to each of the schools for further verification by the participants.

As a result of this process, a few minor changes and additions were made to the transcribed interviews.

4.4.2 Within-case and cross-case analysis.

This study was conceived as a multi-site case study involving four schools. Each school can be viewed as a case on its own, but a deliberate decision was made to embark on a cross-case analysis as part of the overall data analysis process. Merriam (1998) suggests that in a multi-site case study, there are two levels of analysis, starting with the within-case analysis and proceeding to the cross-case analysis. The first stage should be to explore the contextual variables so the researcher can learn as much about these as possible as they may have some bearing on each case (Merriam, 1998). As each of the schools was different, it was very important to explore the context in which the teachers and students work to look for emergent themes that may inform the cross-case analysis. Within-case analysis is regarded as a critical step in coping with the large volume of data generated in case study research (Huberman & Miles, 2002).

Following on from this, a cross-case analysis can be undertaken. Yin (1994) describes this process as ‘an attempt to build a general explanation that fits each of the individual cases, even though the cases will vary in their details’ (p. 112). The researcher is looking to see ‘processes and outcomes that occur across many cases, to understand how they are qualified by local conditions, and thus develop more sophisticated descriptions and more powerful explanations’ (Miles & Huberman, 1994). Huberman and Miles (2001, p. 448) consider that within-case analysis is descriptive, answering questions of ‘what’ and ‘how’, and explanatory, answering ‘why’ questions by offering reasons and supporting claims. A cross-case analysis contributes to the dependability of a case by drawing on multiple examples, and

identifies patterns or configurations that represent broader characteristics (Huberman & Miles, 2001; Cresswell, 1998). Cross-case analysis should be thorough and deliberate to avoid first impressions and premature conclusions influenced by highly visible or superficial data. While cross-case analysis identifies similarities and differences emerging from in-depth familiarity and systematic data analysis across the cases (Huberman & Miles, 2002), a fundamental element of a constructivist epistemology is to preserve the multiple realities of the individual participants (Lincoln & Guba, 2002). The inherent danger of cross-case analysis is that unique features of individual cases are glossed over in favour of the larger case, and that important aspects are lost in generalisation (Huberman & Miles, 2001). Considerable care was taken during initial data collection via detailed field notes to capture the context of each case. Descriptive data, as collected in this study from both teachers and students, are rich in detail drawing on contextual factors (Bogdan & Biklen, 2007). Analysis of these data does not rely on reducing them to numeric counts but attempts to interpret the data within the setting in which it was collected, and to represent those data in meaningful themes and discussion.

4.4.3 Content analysis: Moving from simple descriptive accounts to initial coding.

The process of analysing qualitative data is broadly described as the process of making sense of, interpreting or theorising the data (Schwandt, 2001). He suggests that ‘the analysis begins with the processes of organising, reducing, and describing the data and continues through the activity of drawing conclusions or interpretations from the data and warranting those explanations’ (p. 6). Merriam (1998) reinforces this by describing the process as making meaning from what people have said and what the researcher has seen by consolidating, reducing and interpreting the data in order to

construct meaning. A two-stage approach involves direct interpretation of a particular instance in a case followed by aggregation of instances to form a particular class of event (Stake, 1995). The most basic presentation of a study's findings is a simple descriptive account.

Any description will require thinking through what will be included and what will be left out from the large amount of data collected for the study (Merriam, 1998). The next level of analysis will require some form of coding. This is a process whereby the researcher disaggregates the data, breaking it down into manageable segments and identifies and/or names those segments (Schwandt, 2001). Coding requires the constant comparison and contrast of various successive segments of data resulting in categorisation (Merriam, 1998; Schwandt, 2001; Stake, 1995).

4.4.4 The process of coding the data.

I began the coding process by listening to the stored digital files of each of the interviews while reading the transcripts. By reviewing the digital recordings of the files, I was able to identify points of interest and noted these as possible initial coding points. Schwandt (2001) refers to three possible ways of accomplishing coding. Of particular relevance to this study was his description of 'an *a priori,* content-specific scheme developed from a careful study of the problem or topic being investigated and the theoretical interests that drive the inquiry' (Schwandt, 2001, p. 26). In this study, the scheme for coding was developed from a combination of official documents, theoretical frameworks developed by researchers in the fields of ICT implementation in schools and relevant literature exploring the use of ICT specific to music education.

4.4.5 Developing the framework for coding the interviews.

As discussed above, I employed a content-specific scheme for coding the data contained in the interviews informed by the following:

1. a theoretical framework developed by Way and Webb (2007) for implementation of ICT in primary schools in Australia adapted for this project
2. socio-cultural theory, which clarifies that processes of change in schools and classrooms cannot be understood in isolation because of the influence of regulatory frameworks and policies of national education systems and national cultures (Somekh, 2006, 2008)
3. identification of utilisation of ICT as suggested by Kiesler (in Beckstead, 2001) where the use of technology is described as 'either amplicative or transformative' (p. 47); what is meant by *amplicative* is technology can be used to do traditional tasks more easily or efficiently; a transformative impact is one that shows 'a qualitative change in how people think, act and react' (Beckstead, 2001 p.46)
4. a fundamental change in pedagogy using technology to dramatically change lessons plans and activities (Hennessy, Ruthven & Brindley, 2005)
5. the core musical activities identified as composing, performing and audience-listening (initially described as audition) with an exploration of music literature studies and development of skills in a supporting role (Swanwick, 1997)
6. the 'digital native' as described by (Prensky, 2001, 2005, 2009; Tapscott, 1998, 1999).

Table 4.4

Coding System for Teacher and Student Data

Theoretical Framework	Teacher data	Student data
Way and Webb (2007)—potential of ICT to transform pedagogy:		
• a shift from instructivist to constructivist educational philosophies	√	
• a move from teacher-centred to student-centred learning activities	√	
• a shift from a focus on local resources to global resources	√	√
• an increased complexity of tasks and use of multimodal information	√	√
Somekh (2008)—socio-cultural theory:		
• policies of national education systems, e.g., NZ Curriculum	√	√
• regulatory frameworks, e.g., National Certificate of Educational Achievement (NCEA)	√	
• school culture and context	√	
Utilisation of ICT		
Kiesler (in Beckstead, 2001):		
• amplicative or transformative	√	
Hennessy, Ruthven & Brindley (2004):		
• change in pedagogy	√	
• change in content	√	
Core Musical Activities		
Swanwick (1997):		
• performance	√	√
• composition	√	√
• theory	√	√
• listening (aural)	√	√
'Digital Native'		
Prensky (2001, 2004, 2009):		
• a distinct generation of 'digital natives' exists, Tapscott (1998, 1999)	√	√
• education must fundamentally change to meet the expectations of these 'digital natives'	√	√

4.4.6 Data analysis summary.

In summary, the analytical framework adopted to analyse the data gathered in this project can be described as an *a priori*, content-specific scheme developed from a study of relevant literature surrounding the topic and related theoretical interests that have driven the inquiry (Schwandt, 2001). Data gathered from teacher and student

questionnaires were placed on spreadsheets and coded according to the categories indicated above. The analysis of these data formed the basis of the questions devised for the semi-structured interviews that then took place. As described earlier, interviews were stored electronically and then transcribed. The transcriptions were then coded and data categorised as above. Data were analysed inductively by identifying categories and emerging patterns using a two-stage themed-analysis approach, as suggested by Stake (1994). Silverman (2003) warns of the reliance on interview data and argues that in many situations, it may be just as effective to observe what occurs, for example, in a classroom and examine related documents where practicable. This study included the questionnaires and related field notes and observations in an attempt to verify and validate comments made in the interviews.

4.5 Ethical Considerations

The research was guided by the key ethical principles of informed voluntary consent and protection of participants from risk or harm (Bogdan & Biklen, 2007). Ethical approval was granted by the Educational Research Human Ethics Committee from the University of Canterbury.

4.5.1 Issues of researcher power or coercion.

I was very aware of issues surrounding researcher power or coercion while conducting the research for this project because the position of responsibility I had in our institution could present some challenges while conducting this research (Bogdan & Biklen, 2007). I had some form of personal contact with all four schools. Mr Organist at School A was a classmate when we were training as music teachers at the old Christchurch Teachers' College. My daughters attended School B and at the time I undertook this research, both were members of performing groups at the school. I had been a staff member at School C for nine years from 1989 through to 1996. Mr Brass

at School C remains a close acquaintance. Mr Drummer at School D became head of the music department at School C when I left and remained an acquaintance of mine. As lecturer in the secondary music courses in the GradDipTchLn (Sec) programme at the University of Canterbury, I had direct dealings with all of the schools in two roles. One role was as a person directly involved with the preparation of beginning music teachers, many of whom would often have placements at the four schools. The second role as course coordinator for the practicum papers meant I had direct contact with the wider school including senior management in all four cases. I was aware that the project I was undertaking might be viewed as a way of reviewing the effectiveness of the music teaching programmes in each school and as such, the participants, particularly the teachers, may be reluctant to respond completely honestly in some situations for fear of being viewed as not keeping up with the latest thinking surrounding the use of digital technology in music education.

Issues of power, politics surrounding an organisation, and between institutions combined with potential issues surrounding hierarchy between researcher and participants have the potential to compromise data collection. The politics, power relations and expectations may also lead to feelings of coercion where participants feel obliged to cooperate because of the researcher's position and influence (Bogdan & Biklen, 2007). Care was taken to mitigate potential issues of coercion and to declare my position and biases within the research design. I deliberately made it very clear to all of the participants that the study did not seek to compare the quality of teaching between schools or to appraise teaching staff at each school.

4.5.2 Recruitment of participants in the study.

As discussed previously, the four schools comprising the four cases were purposefully chosen for this study. I was aware of the music programmes offered by

the schools and aware that they all used some form of ICT in the programmes to a greater or lesser extent depending on the school and the class level. All of the schools are perceived by their communities as having flourishing music departments. As a result of my informal knowledge of each of the schools, I was aware that Schools A and B offered more traditional music education programmes whereas Schools C and D offered programmes more suited for students with interest in jazz or contemporary music. Schools A and D use Mac-based software, Schools B and C use PC-based software.

Schools A and B are independent single-sex schools and rated as Decile 10 schools based on the socio-economic backgrounds of the students. Schools C and D are co-educational state schools. School C is rated Decile 6 and School D rated Decile 2. Of the four schools, School D has the highest proportion of Maori and Pasifika students. All of these factors influenced my choice when looking to recruit schools to participate in the project. I was looking to collect as rich data as possible from a wide cross-section of schools.

As part of the ethical approval process, a letter was sent to the principal of each school outlining the project and requesting permission to undertake the research in their school. All principals agreed to their teachers and students participating in the project. A second letter was then sent to the respective teaching staff and all returned the letter agreeing to participate. A letter outlining the project and permission slips were sent via the head of music at each school to students in junior music classes (Years 9 and 10) requesting permission to work with students in each school. I chose that level because of the national requirement for all students to receive some instruction in music at either of the two year levels before they select their subject

options for their external examinations in Year 11. School D proved the most difficult in terms of receiving completed permission slips.

4.6 Establishing the Trustworthiness of the Findings

The approaches for establishing rigour in qualitative work differ from those accepted in quantitative research, because the positivist measures of internal validity, external validity, reliability and objectivity do not fit comfortably within the interpretive research paradigm (Creswell, 2001; Lincoln & Guba, 2002; Merriam, 1998). Quantitative and qualitative paradigms employ different rhetoric to persuade consumers of their trustworthiness (Firestone, 1987). Within the interpretive paradigm, researchers need to adopt alternative criteria and techniques to demonstrate the integrity and trustworthiness of their work. Assessing the validity and reliability of a qualitative study involves examining its component parts as undertaken in other types of research (Merriam, 1998). Issues of validity and reliability can be approached via attention to the conceptualisation of the study, and the collection, analysis and interpretation of data coupled with the way the findings are presented (Merriam, 1998). According to Lincoln (1994, p. 479) studies such as this, which are informed by constructivist epistemology, should demonstrate their trustworthiness by being sufficiently grounded, triangulated, based on naturalistic indicators, carefully fitted to theory (and its consequences), comprehensive in scope, credible in terms of member checks, logical and truthful in their reflection of the phenomenon in question.

Lincoln and Guba (1985, 2002) suggest that interpretive research should be evaluated using the criteria of credibility, transferability, dependability and confirmability. They believe these criteria are more appropriate than the traditional epistemic criteria of internal and external validity (Schwandt, 2001). Creswell (2001) advocates that research quality can be achieved through ongoing verification.

Verification occurs through extensive time spent in the field, detailed 'thick description', and the closeness of participants in the study (Cresswell, 2001, p. 288).

Different criteria and terminology appear in many commentaries in relation to setting standards in qualitative studies. However, the underlying consensus is that it is the researcher's responsibility to minimise misunderstanding and misrepresentation, and to ensure that findings are trustworthy and authentic (Merriam, 1998; Stake, 1995, 2003). Stake (1995) provides a guideline suggesting that researchers should provide sufficient indisputable information to represent what others in the same situation would have observed, and enough detail for the reader to reach similar or alternative interpretations.

The following strategies demonstrate how these principles have guided this study and how trustworthiness is built into the design and implementation of the research.

4.6.1 Reflexivity.

The term 'reflexivity' is used in a methodological sense to refer to the process of critical self-reflection by a researcher on biases, theoretical dispositions, preferences and so forth (Schwandt, 2001). When working in a qualitative inquiry paradigm, with its inherent emphasis on interpretation and emergent design, and where the researcher is the primary *instrument* of data collection and analysis, reflexivity is deemed essential (Merriam, 1998; Stake, 1995). Russel and Kelly (2002, cited in Watt, 2007) contend that through reflection, researchers may become aware of what allows them to see as well as what may inhibit their seeing As such, reflexivity can be a means for researchers to critically inspect the entire research process, including the ways in which they may establish a 'social network of informants and participants in a study' (Watt, 2007 p. 244) and examining personal

and theoretical commitments to a particular view of events or of a particular ideology in an attempt to determine how they may serve as a resource or lens for interpreting data collected throughout the project. Reflexivity understood this way can be seen as a very important procedure for establishing the validity of accounts of social phenomena (Schwandt, 2001).

As discussed earlier in this chapter, I have connections with all the schools selected for this project. I have followed the development of music at School C for a number of years. When I was teaching at School C, I was involved in preparing a proposal for a contract offered by the Ministry of Education to apply for funds to become a *lighthouse school* for the implementation of ICT in secondary schools. School C was successful in their application and I was able to purchase a range of equipment including a range of digital technology to facilitate the introduction of a greater level of ICT into music activities in my classroom. As such, I could be described as a 'technology enthusiast' and this description could indicate a biased view of data collected and the subsequent analysis and final reporting of findings. As Schwandt (2001) suggests, it is important that researchers do not allow their research to become 'nothing more than self-serving ideology' (p. 224). At all times, I endeavoured to communicate to the participants in the study that I was not comparing ICT use or application between schools or working to identify examples of good or poor practice.

A second issue for me was again connected with associations I had with all the teachers in the four schools. In my role as lecturer in music education courses at the University of Canterbury, it could be perceived that I am seen as some form of 'expert' in this field. An unexpected outcome for me conducting the research was how I became 'part of the family' in the music departments in the schools. While trying

hard to remain in the role as independent researcher, I found myself becoming involved in discussions around the requirements of external qualifications, expectations schools may have on co-curricula activities and the like. All of the teachers knew that I had a background as a head of department in music and in some cases were asking my advice around activities, new software choice, curriculum requirements and co-curricula expectations. I was very conscious of trying hard not to let these personal relationships with the teachers influence my actions while conducting the research and 'colour' my interpretation of their actions and responses particularly while conducting the interviews.

4.6.2 Credibility.

Credibility is the strength of qualitative work (Creswell, 2003). It reflects the accuracy and soundness of the data, its interpretations and representations within the research. The following strategies were used to achieve credibility.

4.6.2.1 Prolonged experience and persistent observation in this field.

As described above, I have an extensive background in music education as both a teacher and lecturer. I believe I can be described as a technology enthusiast and have taken an active interest in as many of the latest developments in music technology as possible. This includes digital applications in the music industry as well as in music education in schools. I have had experience in curriculum development at a national level. This occurred after a period of teaching in the UK where I was able to see how useful small, portable keyboards could be in the music classroom along with other related digital technology and in particular sequencing software. My time in the UK coincided with the introduction of the GCSE. The music course in GCSE included performance, composition and listening skills. On my return to New Zealand, I worked with a group of teachers to develop a similar course for a number

of schools in our local area. This new course was then adopted as the new national music course and has now evolved into the various music achievement standards. I have also been involved in the development and marking of national examinations at senior level in music. As a result of these activities, I believe I have maintained a high level of credibility as a music educator in this country.

Prolonged engagement and sustained observation (Creswell, 2003; Lincoln & Guba, 1985) were achieved in several ways throughout the project. The process of recruiting participants, obtaining permission to proceed with the project from the schools, gathering permission from participants and collecting data via questionnaires and interviews took two years. I visited each of the schools a number of times during the course of data collection, transcript verification and classroom observation of students working in a range of activities using digital technologies. Subsequent follow-up visits and informal discussions with participants while visiting schools observing students on practicum have continued up until the present day. I often spent up to an hour discussing my work on this study with the participants and the teachers were very keen to show me examples of new activities they had developed using digital technology and resulting examples of student work.

4.6.2.2 Triangulation.

The design of this research deliberately drew on different types of data (questionnaires, written answers and semi-structured interviews) to provide corroborative evidence of teachers and students' experiences (Creswell, 2003). Stake (1994) advocates confirmation of information through various sources, particularly when the interpretations are contestable. Evidence was also corroborated via extensive field notes, observations of teacher and student interactions and follow-up discussions post interview transcription.

4.6.2.3 Researcher bias.

Clearly stating the researcher's status, assumptions and interests reveals the biases and orientation, which have influenced the study (Merriam, 2001). My own position, interests and assumptions in relation to ICT use in music education have been made explicit. While these cannot be eliminated, they are acknowledged and written into the study in order to recognise their influence.

4.6.2.4 Member checks.

Member checks are regarded as 'the most critical technique for establishing credibility' (Lincoln & Guba, 1985, p. 314). This strategy allows participants to verify the data analysis, interpretation and conclusions of the research. Detailed analyses of teacher and student data in each of the four cases were prepared for each school.

These case descriptions and analyses were sent to the participants for their comment, which is a technique recommended by Stake (1994). This was an important strategy in verifying my interpretations and confirming that the organising themes and examples aligned with teachers and students' understandings of what they had said.

4.6.3 Transferability.

Case study research has often been criticised because specificity limits the ability to generalise from a particular case to other contexts (Merriam, 2001). However, case studies allow generalisations either about an instance or from an instance to a class. Their peculiar strength lies in their attention to the subtlety and complexity of the case in its own right (Cohen & Manion, 1994). Cohen and Manion (1994) note that case studies have the potential to present research in an accessible form, which improves understanding of processes as well as implications. Rich, thick descriptions are a hallmark of qualitative research (Merriam, 2001) and these comprehensive descriptions enhance the ability of the reader to translate the

information to another context (Creswell, 2001). In order to facilitate the transferability of this research, detailed accounts are provided of the context, research processes and decisions relating to theory and interpretations. Participants' perspectives are portrayed along with supporting examples and quotations to reflect, as faithfully as possible, the details of their experiences.

4.6.4 Dependability.

Dependability is qualitative research's equivalent to reliability, and reflects the extent to which the research processes are conducted consistently over time (Neuman, 2003). Miles and Huberman (1994) advise that dependability can be demonstrated by congruency between research design and research questions; openness about the researcher's role and biases; findings that emerge from multiple data sources; clarity about theoretical frameworks; breadth of data collection across settings, participants, and time; and the use of research teams and peer review. The importance of researchers acknowledging their own biases and preconceptions, and actively exploring the surprises or disconfirming data that challenge their viewpoints is essential (Merriam, 1998; Schwandt, 2001) With the exception that I did not work with a research team and, consequently, could not access peer review, all of these criteria suggested above have shaped the research design, implementation and reporting of this project.

4.6.4 Confirmability.

Confirmability represents the degree to which a different researcher might have arrived at the same conclusions. The findings should be a reflection of the data drawn from participants, and able to be confirmed by an audit trail consisting of raw data and field notes, analysis strategies, summaries, process notes, and rationale for decisions made during the research process (Lincoln & Guba, 1984). I have made

consistent use of electronic means to record, collate, store and analyse the data including questionnaire data, interview transcripts, and my own notes and reflections. I have also kept hard copies of all transcripts, spreadsheets of quantitative data including coding and the formulas used for generating numerical results. All hard copies of data, field notes, analysis strategies and rationales for decisions made during the research process remain available for view if required.

4.7 Summary

This chapter briefly described the context for research in music education in New Zealand. It discussed the interpretive research paradigm, and the methodological and philosophical considerations influencing the design of the multi-site case study. It provided details of the data collection process through a quasi mixed-methods approach where descriptive numerical data was gathered first and used to inform the investigative strategies in the case studies. It then provided the details of the subsequent analysis strategies, as well as a rationale for the choice of frameworks and tools. The detailed description of the research design, the systematic approach to managing the data, and the rationale provided for methods and strategies in analysis have made the research processes explicit. They have also helped to establish the trustworthiness and credibility of the findings.

Chapter 5: Teacher and Student Questionnaire Data

This chapter presents the results of the descriptive numerical data gathering processes used to examine how both teachers and students perceive the usefulness of digital technology in music education. The data gathered in this first part of the project was used to inform the questions in the semi-structured interviews that were conducted following this initial phase of the project. The data gathered here is reported and then briefly compared with findings from relevant studies as described in the earlier literature review chapters. A more in-depth analysis and comparison will take place in the following case study chapters.

This chapter is divided into two sections. The first section will report the aggregated data from the teacher questionnaires and then compare it to findings from relevant studies. The second section will examine the aggregated data from the student questionnaires and do the same.

5.1 Aggregated Teacher Data

Nine teachers in the four schools were asked to complete a questionnaire. This questionnaire was designed with four sections. The first section was designed to collect general data pertaining to their music education background, the number of years they had been teaching and their responsibilities in specific areas of music education in the school. The second section was designed to gather information on their of use computers at home and at school. The third section examined their perceptions of the use of digital technology in music education with specific reference to activities referred to in earlier chapters concerning the traditional music education skills of performance, composition, aural and knowledge and understanding of music theory and music works. The fourth section consisted of a series of more open-ended questions and provided the teachers with an opportunity to write more specific

responses concerning their use of digital technology in their teaching in the music classroom. Data from this section will not be discussed in this chapter.

5.1.1 Personal use of digital technology.

Part one of the questionnaire examined the teachers' use of technology at home and at school. The following table summarises the personal use of computers of the nine teachers involved in the study.

Table 5.1

Teachers' Personal Use of Digital Technology

School	Teacher	Computer at home	Computer at school	Operating system at home	Operating system at school
A	Mr Organist	√	laptop	PC	Mac
	Mr Violinist	√	lap & desk	Mac	Mac
B	Mrs Conductor	√	laptop	PC	PC
	Ms Singer	√	desktop	PC	PC
C	Mr Bass Guitarist	√	lap & desk	Mac & PC	PC
	Mr Brass	x	desktop	n/a	PC
D	Ms Saxophonist	√	lap & desk	PC	Mac
	Mr Drummer	√	lap & desk	Mac	Mac & PC
	Mr Guitarist	√	laptop	PC	Mac & PC

Data gathered here would suggest that all of the teachers involved in this study were regular users of digital technology either at home or at school. All but one of the teachers had computers both at home and at school. Four of the teachers had laptops and desktop computers. Two of the teachers worked with both operating systems at school. One teacher works with both operating systems at home.

5.1.2 Teachers' confidence in using technology.

Part two of the questionnaire examined the teachers' confidence surrounding their use of digital technology in their schools and in their music rooms. The second question asked about the frequency of use and whether they used technology more with junior classes

Table 5.2

Teachers' Confidence in their use of Digital Technology

I am a confident use of technology in most tasks in the school	
Strongly disagree	0
Disagree	0
Agree	7
Strongly agree	2
I am a confident user of music technology in the classroom	
Strongly disagree	0
Disagree	0
Agree	6
Strongly agree	3
How often do you use technology when teaching music?	
Never	0
Sometimes	0
Regularly	5
All the time	4
I use technology more often with junior classes	
Strongly disagree	1
Disagree	6
Agree	2
Strongly Agree	0

Data here would suggest the teachers were regular users of a range technology, including digital technology in their music rooms. Two teachers indicated they use technology more often with junior classes. Six teachers disagreed, which might suggest they might use technology as much or even more with their senior classes. This possibility was explored in the semi-structured interviews and is discussed in considerable depth in two of the four case studies that follow this chapter.

5.1.3 Usefulness of technology in music activities.

Part 3 of the questionnaire asked the teachers to rank the usefulness of technology in traditional activities in music education.

Table 5.3

Teachers' Responses to Questions on Technology Use in Music Activities

I think technology is useful for teaching music in the following areas:	
1. Performance	
Strongly disagree	0
Disagree	2
Agree	4
Strongly agree	3
2. Composition	
Strongly disagree	0
Disagree	0
Agree	1
Strongly agree	8
3. Theory	
Strongly disagree	0
Disagree	4
Agree	4
Strongly agree	1
4. Aural skills	
Strongly disagree	1
Disagree	1
Agree	6
Strongly agree	1
5. Music works / Set Works	
Strongly disagree	0
Disagree	0
Agree	8
Strongly agree	1

Data gathered in this section provided some interesting early findings. The most significant response was all of the teachers considered technology most useful in teaching composition. This result was expected as the majority of relevant literature describes studies into how digital technology has been used for composition tasks (Berkley, 2001, 2004; Folkestad, 1991; Folkestad, Hargreaves & Lindstrom, 1998; Nilsson & Folkestad, 2005; Odam, 2000; Odam & Patterson, 2000; Seddon & O'Neill, 2003). Responses to the question around the study of traditional set works or music literature might indicate all teachers consider technology useful in teaching this part of the music curriculum. All of the teachers referred to either the use of YouTube or other video clips as a great resource for showing students performances of

particular works they were studying. The use of YouTube will be described and discussed in more depth in the case studies that follow this chapter.

The teachers also wrote about students regularly using computers to undertake research related to the music works they were studying. A small majority of the teachers expressed the view that technology was useful in teaching aural skills while opinions were divided on how useful technology was in teaching performance skills.

5.1.4 Technology use and achievement.

Part four of the questionnaire explored the teachers' opinions regarding improved student achievement because of technology in the same activities described in the previous section.

Table 5.4

Teachers' Opinions Regarding Improved Student Achievement

Students are able to achieve at a higher level because of technology in the following areas:	
1. Performance	
Strongly disagree	1
Disagree	1
Agree	5
Strongly agree	2
2. Composition	
Strongly disagree	0
Disagree	1
Agree	0
Strongly agree	8
3. Theory	
Strongly disagree	0
Disagree	5
Agree	3
Strongly agree	1
4. Aural skills	
Strongly disagree	1
Disagree	1
Agree	6
Strongly agree	1

Data here shows that most of the teachers agreed that technology was useful in improving student achievement in teaching performance, composition and aural skills.

The one area where some disagreement was evident was in the teaching of music theory. This apparent difference in thinking among the teachers was explored further in the semi-structured interviews and is discussed in some detail in the case studies.

5.1.5 Numbers, authenticity and engagement.

The second section of this part of the questionnaire asked the teachers to respond to questions regarding numbers of students opting for music because of technology, authenticity of tasks because of the use of technology and levels of engagement in tasks that use a high level of technology.

Table 5.5

Numbers of Students Opting for Music

Student numbers in option classes have increased because of the use of technology	
Strongly disagree	0
Disagree	5
Agree	3
Strongly agree	1
Students view tasks as more 'authentic' when they are using technology	
Strongly disagree	0
Disagree	4
Agree	3
Strongly agree	2
Students' levels of engagement are higher in activities when using technology	
Strongly disagree	0
Disagree	1
Agree	5
Strongly agree	3

Data gathered here shows a mix of opinions among the teachers in two of the questions. Opinions appear divided as to whether student numbers have increased because of the use of technology in the music classroom and whether students view activities in the music room as more *authentic* (in this context referring to similar to accepted practice in the music industry). However, the majority of teachers do appear to believe that students' levels of engagement are higher when using technology in activities in the music classroom.

5.2 Initial Discussion on Teacher Questionnaires

Data gathered from the teacher questionnaires indicates a high use of digital technology at home and at school. This was an expected outcome, as many forms of digital technology have become ubiquitous in most music classrooms in this country and around the world and has been discussed by many commentators (Burnard, 2007; Crow, 2006; Odam, 2003; Savage, 2005a; Southcott & Crawford, 2011; Webster, 2002a). There is an expectation by school administrators, parents and students that teachers will be familiar with a range of digital technologies and that they will have the ability to integrate these technologies into the activities that are presented in the classroom.

The ability to use specific music software including sequencing and notation software is an expected skill for music teachers (Berkley, 2004; Desmond, 2002; Folkestad, 1991; Folkestad et al., 1998). The teachers in this study all considered that digital technology was most useful in teaching composition, as suggested by numerous commentators (Berkley, 2001, 2004; Folkestad, 1991; Folkestad et al., 1998; Nilsson & Folkestad, 2005; Odam, 2000; Odam & Patterson, 2000; Seddon & O'Neill, 2003). This again was an expected finding as the use of specific software to write music appears to have replaced traditional handwritten scores in all sectors of the music industry and in schools around the world. The assessment specifications for composition tasks in many school qualifications from around the world usually include references to scores being created electronically.

Most teachers thought technology was useful for teaching traditional set works or music history, music theory and aural skills. The activity where opinion was most divided was the use of technology in teaching performance skills. While the participants in the study came from a mix of traditional music and contemporary

backgrounds, only the teachers at schools with internet access in their classrooms wrote about using YouTube to help teaching performance skills. This is discussed in more depth in the relevant case studies.

The majority of teachers indicated they thought technology increased student achievement in all of the traditional activities in a classroom except with music theory where opinion appeared divided. All the teachers indicated they believed student engagement was higher in activities using technology but opinion was again divided as to whether numbers opting for music had increased because of the level of technology used in the classroom.

5.3 Aggregated Student Data

Student questionnaires were completed by members of music classes at the four schools involved in this study. In School A, students in Year 9 (first year high school) and Year 10 (second year of high school) completed the questionnaires. School A was unique in the study as they have a general music class, which all students must attend in Years 9 and 10. In the other three schools, Year 9 students from music option classes completed the questionnaires.

The student questionnaire was similar to the teacher questionnaire but was comprised of only three sections. Demographic data was collected in the first section. The second section asked questions about previous exposure to digital technology and in particular music software use either at home or at a previous school. The third section examined students' perceptions about the usefulness of technology in the accepted activities in the music room.

5.3.1 Personal details.

Part one of the student questionnaire explored computer use at home and at school. It included questions about how students may use their computers for

activities connected with music. A further question examined their experiences with digital technology at their previous school as well as their current school. Details from this section are represented in the following table.

Table 5.6

Student Personal Details (n = 182)

Average age	14 yrs
Male	72%
Female	28%
Computer at home	Yes = 99% No = 1%
Listen to music on computer	Yes = 80% No = 10%
Music software on home computer	Yes = 31% No = 69%
Use music software at home	Yes = 19% No = 81%
Music software at previous school	Yes = 46% No = 54%
Play a musical instrument	Yes = 64% No = 36%

Data in this section indicates a high level of computer use by the students participating in the study. The percentage of students indicating they listen to music on their computer is significant. Adolescents constantly listen to music produced using some kind of technology and form impressions on how it is created (Folkestad et al., 1998). Other significant percentages would show that just under a third of the students have music software loaded on their home computers while fewer than 20% of the students reported using it. Data would also indicate that nearly half of the students had used music software at their previous school. Finally, just under two-thirds of the students involved in the study indicated they play a musical instrument.

5.3.2 Students' confidence with technology.

Data gathered from the questions asking students to rate their confidence in using technology in school is presented in the following table.

Table 5.7

Student Confidence in Using Technology

I am a confident use of technology in most subjects in the school	
Strongly disagree	0%
Disagree	6%
Agree	57%
Strongly agree	37%
I am a confident user of music technology in the classroom	
Strongly disagree	5%
Disagree	21%
Agree	56%
Strongly agree	18%

Data here shows that the majority of students feel very confident about using technology in subjects across the school. This was an expected result as the level of technology and in particular digital technology available to students in both primary and secondary schools continues to grow at a substantial rate and digital literacy skills are recognised as essential for students in the twenty-first century (Ministry of Education, 2006). However, just under a third of the students indicated that they feel less confident using technology in their music classes.

5.3.3 Usefulness of technology in music classes.

The next series of questions asked the students to rank the usefulness of technology in the traditional activities in music classes.

Table 5.8

Usefulness of Technology

I think technology is very useful in music classes in the following areas:	
1. Performing music	
Strongly disagree	3%
Disagree	20%
Agree	53%
Strongly agree	24%
2. Writing music	
Strongly disagree	1%
Disagree	8%
Agree	46%
Strongly agree	45%
3. Helping to understand music theory	
Strongly disagree	1%
Disagree	21%
Agree	61%
Strongly agree	17%
4. Listening to music	
Strongly disagree	0%
Disagree	5%
Agree	29%
Strongly agree	66%

Data collected in this section would indicate that the majority of students view technology as useful in all of the activities they are regularly involved in when in their music classes.

5.3.4 Enjoyment and authenticity.

Students were asked to respond to questions about enjoyment in activities in music using technology and whether they felt activities using technology were more authentic.

Table 5.9

Enjoyment of Activities Using Music Technology

My level of enjoyment in music is higher in activities when using technology	
Strongly disagree	0%
Disagree	17%
Agree	50%
Strongly agree	30%
I can create music that sounds more realistic using technology (like on the radio)	
Strongly disagree	6%
Disagree	31%
Agree	47%
Strongly Agree	15%

Data gathered here indicates that the majority of students would appear to enjoy music more when using technology in activities in the classroom. Two-thirds of the students feel that they are able to create more realistic music using technology.

5.3.5 General questions about music.

The final section of the student questionnaire asked some general questions about music. It was designed to gather information on which activities students liked most in their music classes and which activities they liked least. It also included a question about reading music and whether students thought it was necessary to be able to read music in order to play a musical instrument.

Table 5.10

General Questions about Music

Do you think it is important to be able to read music before playing instruments?	
Yes	63%
No	37%
What activity do you like most in music classes?	
Playing instruments	35%
Writing songs/pieces	14%
Listening to music	51%
Music theory	1%
What activity do you like least in music classes?	
Playing instruments	4%
Writing songs/pieces	19%
Listening to music	1%
Music theory	76%
Do you think using technology in music allows you to do more interesting things?	
Yes	76%
No	24%

This final section suggests that the majority of students think it is important to read music before playing an instrument; however, over a third thinks that it is not important. As the majority of the students participating in the study had opted for music as a performance class, this was an expected result. However, there may be some recognition by some of the students that informal music education such as learning songs either individually or in groups does not require knowledge of traditional music notation.

Just over one-half of the students surveyed indicated that listening to music is the activity they liked most in music classes followed with over a third showing they liked playing instruments. The majority of students surveyed showed they liked music theory least as an activity in music with a much smaller number indicating that writing music is the next least liked. Finally, over three-quarters of the students believed technology in music allows them to do more interesting things.

5.4 Initial Discussion on Student Questionnaires

The students participating in the study indicated a high level of personal technology use. This was an expected result as many commentators working across a range of disciplines have discussed the influence new technologies and in particular, digital technologies are having on students in schools in the twenty-first century (Cuban, Kirkpatrick & Peck, 2001; Jonassen, Howland, Moore & Marra, 2003; Loveless, DeVoogd & Bohlin, 2001; Loveless & Longman, 1998; Prensky, 2001, 2005, 2009; Tapscott, 1998, 1999; Webster, 2002a). The students participating in this study do not know of a world without a range of digital technologies and may grow into a world where they may experience new forms of digital technology that have yet to be developed (Webster, 2002b). We know that technology is deeply embedded in the contemporary lexicon of many young people's musical lives and that the internet is their playground. Young people tend to have familiarised themselves with ICT innovations before their parents and teachers have—a reversal of the usual hierarchical roles (Wise, Greenwood & Davis, 2011). Some of these students will have experienced digital technology at a very young age, some in early childhood centres and most if not all will have been exposed to a range of digital technologies during their time at primary and intermediate schools. They are experienced users of such technologies and most, if not all, would use such technologies on a daily basis.

A significant percentage of the group regularly used their home computers to listen to music. This too was an expected result as a number of studies have discussed how important music and a musical identity is to adolescents (e.g., Hargreaves, Marshall & North, 2003; Lamont, 2002; North, Hargreaves & O'Neill, 2000; Wright, 2002) For many students, popular music constitutes what Hargreaves, Marshall and North (2003) referred to as a 'badge of identity' (p. 156). Many students' social and

cultural allegiances are displayed through their membership of a particular group of music enthusiasts, for example, lovers of hip hop, rap, club dance fans, heavy metal fans and so forth (Wright, 2008). For this particular generation, the majority of the music that they purchase comes in the form of a digital download. Recent figures from the US show indicated that digital downloads have now passed the billion-unit mark for the first time and in January 2012, digital sales overtook physical sales for the first time with digital sales making up 50.3% of all music sales (Billboard Magazine, 2012).

The students indicated they were confident users of technology in most subjects in school but appeared to be less confident when using specific technology in their music classes. Three of the four schools introduce notation software to students in their junior classes and to be able to use it students do need to have an understanding of traditional music notation and music theory. Although the teachers in the schools have a carefully prepared series of activities that allow the students to develop skills in basic operation, it would appear that some of the students find it difficult to use as they struggle to make a connection between what they are seeing on the screen and what they perceive music is. In other words, they may compare sequencing software that may include pre-recorded loops that sounds like real music with notation software that does not include any pre-recorded loops and requires them to enter the notes directly on to the music staves represented on the screen. This apparent musical *disconnection* is something Green (2001, 2008) describes when exploring some of the differences between formal and informal approaches to learning about music. For many musicians who specialise in working with contemporary music, traditional music notation is something that at best is at times

confusing and at worst a poor representation of what the musician actually hears on a particular recording (Green, 2001).

The majority of students indicated they thought technology was useful in all of the traditional activities in their music classes and they showed that they felt they were more engaged in activities that used technology. A growing body of research indicates that students expect to use a range of digital technologies in the classroom and in many cases, will be more engaged in tasks when using this technology (Selwyn, 2002, 2011; Tapscott, 1998, 1999). The students participating in this study were exposed on a regular basis to tasks using digital technology, usually related to composition, in all of the schools. This will be discussed in more depth in subsequent chapters in the case studies.

Two-thirds of the students felt they could create more authentic music when using technology. The question of authenticity of task is another topic that a number of writers have explored (Bolden, 2009; Elliott, 1995; Schippers, 2006; Swanwick, 1999; Vakeva, 2010; Westerlund, 2006). Elliott (1995) and Swanwick (1999) argued for the inclusion of authentic tasks and activities along with the inclusion of practical music making in the classroom in a supportive environment, which should encourage creativity via performance, composition and improvisation. Westerlund (2006) explored this further in a modern context with a discussion around how garage rock bands work in an informal manner and how it may be possible to model such practices in the classroom. Vakeva (2010) discussed the possibilities that digital technology provided via social media for musicians to take a particular piece or fragment of music and manipulate it to create something of their own. Bolden (2009) described a case where the music teacher developed authentic composition tasks for students that appeared to meet the needs of the particular group of students really

well. The question of authenticity of task using the definition as discussed in Chapter 1 will also be explored in more depth in subsequent chapters.

Listening to music was shown to be the most preferred activity and music theory the least preferred. As discussed in Chapter 3, evidence exists from a number of commentators that many young musicians do not consider a knowledge and understanding of traditional music theory and notation important. In fact, being taught such skills in a purely theoretical manner without showing the application of this knowledge in context may be responsible for what many studies undertaken in the previous decade described as *alienation* from music in schools (Green, 2001, 2006, 2008; Wright, 2002, 2008). I will discuss this in more depth in the context of the case studies in subsequent chapters.

Seventy five per cent of the group believed technology allowed them to do more interesting things in music. This result again could reflect that the current generation of high school students are very used to working with a range of technologies and in particular digital technologies on a regular basis both at home and at school, in either formal or informal learning situations. According to Prensky (2001), these ‘digital natives’, as he terms them, appear to think and process information in a way that is different from that of their parents and grandparents. More recently, Prensky (2009) has changed his view as we have moved further into the twenty-first century and indicates that not all young people can be referred to as ‘digital natives’ and that the distinction between digital natives and digital immigrants has become less relevant. A continuing challenge that technology brings music teachers is finding ways to bring into the school setting the knowledge about digital music composition and production that students develop outside of school (Wise, 2010).

5.5 Summary

In this chapter, I presented the initial descriptive numerical teacher and student data gathered from the four schools participating in the study. I presented the results of the aggregated data for both teachers and students within the schools. I began a preliminary discussion on issues emerging as a result of the findings from this data. I signalled areas that I will explore in more depth in the context of each case study in the chapters that follow. The next four chapters describe the case studies of the four schools selected for this study.

Chapter 6: Case Study 1: School A

> Kids today are far more aural listeners, they listen to a more diverse range of music that maybe we didn't do as young people. They are rhythmically, far more aware today and they have this ability of just being able to create stuff because they are living in a very aural world. (Mr Organist, School A)

6.1 Introduction

This study examines the use of digital technology in music education in four New Zealand secondary schools. An exploration of the perceptions of teachers and students of this technology contributes to this process. In this chapter, the first of the four case studies is presented. An understanding of the context in which the teachers and students work plus an understanding of the underlying philosophy of teaching held by teachers helps inform our understanding about the choices teachers make in relation to musical activities. Setting can be hugely influential on possible outcomes. In order to provide an understanding of context, this chapter begins by describing the school, the buildings, the two teachers, the kind of students that attend School A and the range of musical activities provided by the music department. A philosophy of teaching is generally viewed as a set of underlying principles that guide and sustain a teacher's work throughout the trials and challenges over a teaching career (Fraser, 2012). These personally held values, attitudes and beliefs guide teaching practice and help shape choices in content and learning focus. Training, personal interests, formative experiences and professional strengths also shape the work of teachers and the choices they make about the kind of musical activities, related resources and styles or genres of music presented in the classroom. Accordingly, these are discussed in the first section of this chapter before I begin a discussion and interpretation of the data gathered in this case. I follow this by identifying some of the emerging issues arising from this discussion.

6.2 Introducing School A

School A is one of the oldest independent, single-sex boys' schools in the country. The school was established on its current site in 1856, close to the centre of the city. It was founded by a group of people who also founded the Anglican Diocese of Christchurch, and is an integral part of the education associated with the Diocese. The school was modelled on the Public Schools of England and in its earliest days, emphasis was placed on a classical education that included Greek, Latin, modern languages, mathematics, English, history and geography. Boys were also expected to conduct scientific experiments and to draw and sing.

The College Chapel has always been the focus of the school and as a result, singing has taken on a more important role in music education than in other schools because of the expectations on the boys to contribute to the services conducted in it. The Chapel Choir has been a very important part of school life and at present has over 60 members. The tradition of singing at the school is very strong and the school continues to have a House Music Competition that remains one of the most popular events in the school year. Full participation is required from all houses and they compete in a massed choral item competition as well as in smaller instrumental and vocal groups.

6.2.1 Introducing Mr Organist and Mr Violinist.

The music block is off to one side of the main buildings at the front of the school and is connected to the large auditorium via a covered, raised walkway. The two-storey building was originally constructed as an administration building but was converted to become the music block a number of years ago. A walk through the corridor on the bottom floor towards the stairs in the middle of the building looking at the layout of the building confirms my thoughts that this building could be described

as a typical school music suite in that it consists of two teaching spaces and a number of practice rooms. I was a little surprised at the standard of the facilities, as this was not what I expected. Many independent schools have invested considerable sums of money in performing arts blocks. School A has a purpose-built drama theatre located on the other side of the large auditorium and it is considered one of the best examples of a small drama theatre in the city. When compared to the drama theatre, which at the time of construction was seen as almost state of the art, the facilities in the music department appear a little dated.

The building has been designed with two classrooms, one on each floor, a number of separate practice rooms, storage spaces and offices for the Director of Music, Mr Organist, and his associate, Mr Violinist. In the main stairwell that connects the two floors are a number of large photographs of many of the performing groups from previous years. The photos of the large chapel choir are particularly evident as are the number of gold and silver awards the choir has received over the years when participating in the finals of the Choral Federation Big Sing choral festival and these testify to the ongoing success of this particular ensemble. Photographs of the instrumental ensembles are also hung on the wall but they are not so prominent.

Mr Organist greets me in his usual forthright and enthusiastic manner and is quick to welcome me to the school and the music department. Mr Organist is dressed in a suit and is wearing a tie. Teachers working at School A are required by senior management to dress formally. He is just over 50 years old and has been working at School A for the last six years. He meets and greets a number of students warmly as they pass by heading for class and ushers me into his office where we meet with Mr Violinist and sit and discuss the intentions I have for School A's participation in this project.

Mr Organist has a degree in music majoring in voice and choral techniques. I knew Mr Organist well, as he was a member of my class when I was at Teachers' College in the early 1980s. More recently, I worked with him when I was involved in marking NCEA and he was an examiner for one of the external examinations. We also have worked together placing student teachers at School A as he is the liaison teacher for his school and is responsible for arranging practicums for students. Mr Organist was completing a postgraduate qualification at the university and had a good understanding of research and recognised its importance. He was interested in my approach and my particular methodology, as he told me he had completed two research papers as part of his own postgraduate study. I felt that he was very willing to help me based on our professional relationship and because he had really enjoyed his postgraduate studies as part of his continued interest in research in music education.

However, I did not know Mr Violinist very well at all. Mr Violinist has a music degree majoring in instrumental music with performance on violin and trumpet. He is older than Mr Organist is and has worked both as a classroom music teacher and as an itinerant teacher of strings initially in the UK before being appointed to his current position eight years ago and moving to New Zealand. He too was dressed formally in a suit and tie. This was the first time we had met and initially he appeared to be a little reluctant to want to participate in the study and seemed unsure if he even wanted to complete the questionnaire or find time to be interviewed by me. On reflection, this initial reluctance may have resulted because he was uncertain of my role as a researcher and whether I may be trying to identify weaknesses in the work he did at the school. As a result of this perceived reluctance at this initial meeting, I was deliberately very open with him about the project and worked hard to establish some

kind of relationship with him by asking questions about his musical background, his teaching experience and where he studied in the UK. Once he learnt that we had a common experience teaching in the UK in the 1980s when GCSE was first implemented, he became more interested and showed a willingness to work with me on this project.

My initial impression following this discussion was that School A had a highly organised department with a great deal of music happening, albeit mainly traditional activities that would be expected in a school such as School A. Mr Organist told me that because of his very busy schedule, it was important that a high level of planning and organisation was in place to meet all the expectations of students, parents and senior management in the school.

What was evident was a great deal of computer technology with new Apple desktop computers visible in the office and nearby teaching space. Mr Organist and Mr Violinist were clearly busy and although happy to speak with me about the project, were keen to get on with their teaching and their co-curricula work either with the choir or with a range of instrumental groups. One thing that struck me immediately was the fact that I was going to find it difficult to hold an impartial position in any discussions we may have about teaching, music teaching and the use of technology in both. Both teachers soon proved to have strong opinions on these topics and were keen to hear about what I thought about the latest developments in the music curriculum, the way I am currently preparing beginning music teachers and my views on the music courses they were offering at School A. Both teachers appeared to be strong advocates for School A and the context in which they worked. Throughout our initial discussion, both teachers regularly referred to the special nature of the school with its strong focus on tradition and traditional musical activities such as the

Chapel Choir and the expectations that are placed on them by the school and the parents of the students.

6.2.2 Music at School A.

If you were to ask a parent of a student attending School A about a special feature of music at the school, they would probably reply that it would have to be the Chapel Choir. This choir currently has around 60 members and they come from all year levels in the school. All students at School A attend regular chapel services during the week and they sing, as a school, on these occasions. The Chapel Choir contributes regularly to the Sunday services, which are open to the public. This contribution is viewed as very important in the life of the school. In the last six years, the choir has travelled to Europe and sung in cathedrals in major European capitals including Rome where they sang for the Pope at St Peter's. The choir also participates in the Choral Federation's Big Sing Festival. The choir has been selected to attend the national final of this choral festival many times in the last 10 years and, over the years, has received a number of gold awards for their performances. Being a member of the Chapel Choir is seen as belonging to a very prestigious group by the students at School A and auditions are always well attended by students wishing to join the choir.

Outside of the classroom, School A offers tuition in a range of classical and contemporary musical instruments. This includes high and low strings, brass and woodwind. Electric guitar, bass guitar and drums are also available as well as orchestral percussion. Tuition is also available in voice, piano and pipe organ. The school offers a range of performance opportunities in both large and small groups for the students. The school has an orchestra, which combines with a local sister school for weekly rehearsals. The school also has a large concert band and a smaller jazz

band that regularly participate in concert band and jazz band festivals and competitions throughout the year in various locations around the country.

The classroom music programme at School A provides compulsory general music classes for all students at Year 9 and Year 10 levels. This is unusual, as most schools in New Zealand would offer compulsory classes only at Year 9 and by Year 10, music would be one of a range of optional subjects available for students to select. The content and range of activities undertaken in junior music classes in New Zealand is guided by the New Zealand National Curriculum and, according to the requirements stated in the document, should include a range of activities including using digital technology where appropriate. The content in Year 9 and Year 10 classes at School A is informed by the national curriculum requirements. Music in the senior school at School A (Years 11–13) is offered at NCEA Level 1, Level 2 and Level 3 as well as scholarship and students are encouraged to enrol in all of the achievement standards at each level. As Director of Music at School A, Mr Organist had organised the teaching within the department. Mr Violinist was responsible for the Year 9 classes; Mr Organist the Year 10 classes, Mr Violinist the Year 11 class and Mr Organist taught the combined Year 12 and Year 13 class. This arrangement would be typical of how a teaching load may be shared across the year levels within a school.

In our initial discussions, both Mr Organist and Mr Violinist commented on the challenges and tensions they were facing working in School A. The teachers described feeling under considerable pressure to maintain a strong co-curricula music programme, both choral and instrumental, that was visible both nationally and internationally. Mr Organist said that although they both felt supported by senior management, expectations on the numbers and types of performances required throughout the year were becoming unrealistic. He felt senior management did not

realise how much time and effort was required to prepare ensembles for public performances while facing competing forces such as drama rehearsals, sports practices and other activities outside the classroom.

The two teachers expressed concerns at the place drama was starting to take in the life of the school and said that they had recently had to lobby hard to retain the existing music programme, as they were facing a strong challenge by the Head of Drama to take some of the time allocated to music in Year 10 for classes in drama. There appeared to be some underlying resentment that the Head of Drama had a new and very impressive drama theatre in which to work while they were working in a building, which although adequate, could hardly be described as cutting-edge. The teachers expressed a desire for more room and more resources. One might be tempted to speculate that the popularity of this subject could be a result of more accessible and perhaps more relevant content and pedagogical approaches taken by the drama teachers.

6.2.3 Students at School A.

School A is organised in the manner of an English public school and students are placed in houses. At present, there are 10 houses at School A, six for dayboys and four for boarders. Each house has around 60 students from Year 9 through to Year 13. Students attending School A come from a range of backgrounds, but most could be described as privileged. As an independent school, parents are required to pay tuition fees and, over a period of five years, these fees represent a substantial investment in a child's education by their parents. In any year group at School A, there are a few students that are able to attend the school due, in part, to considerable financial sacrifice by their parents.

As is the case in many independent schools, parents have high expectations of academic achievement by their children, and often the reason they send their children to a school such as School A is that they perceive that their child will receive improved teaching in small classes where there may be a greater focus on teaching and learning. Student behaviour in class is expected to be of a high standard and the focus on achievement, coupled with high expectations is perceived as an essential feature of the school. However, it could be argued that it is not only independent single-sex schools that have these perceptions surrounding achievement. In a recent online study, data gathered indicated that parents perceive student achievement as being a key indicator of success at single-sex schools both in state and independent schools (Boustead, Greenwood & Alam, 2012).

Students attending School A wear a distinctive school uniform, once again modelled on the English public school tradition. Students are required to be well groomed and tidy and this was evident from my first visit to the school. Uniforms were very tidy and the students appeared to take some pride in their appearance. They were polite, engaged in classroom activities when observed, and clearly enjoyed a positive relationship with both Mr Organist and Mr Violinist. A very concrete example of the level compliance was the 100% return of permission slips required for ethical clearance and 100% completion of the initial student questionnaire. This high level of compliance would reflect the parental support the school enjoys concerning activities undertaken as part of attending the school. This completion rate was the highest of all the schools involved in this project.

Students attending School A come from a mix of ethnicities but the majority are from white, middle-class families. However, an increasing number of students from Asian backgrounds are currently attending the school while there are very few

Maori or Pacific Island students enrolled. Typical of the mix of students were the six students selected by Mr Organist for the group interview. One student was born in South Africa and his parents, a doctor and a teacher, had come to New Zealand 10 years ago. A second student was born in Korea and had travelled to this country initially with his mother, before his father joined them a few years ago. He had attended primary school in Korea before coming to New Zealand and had learnt English since arriving here. The remaining four were born in New Zealand and had parents who were either business people or professionals with occupations including a lawyer, an architect and a dentist.

6.3 'Aesthetic' Education

As described earlier, the music programme at School A is quite unusual in the New Zealand school context, as music is compulsory at both Year 9 and Year 10. This would have been the situation in many New Zealand schools around 20 years ago but is particularly unusual now. The current national curriculum document groups music–sound arts with visual art, drama and dance. This 'contested' curriculum has placed considerable pressure on time allocations for each area within a school's junior curriculum organisation and, as a result, Music at Year 10 level in most schools in New Zealand is offered as one of a number of optional classes available for students to select.

Mr Organist described for me how he structures the activities in the classroom for both year groups at School A and in particular, what they do with the Year 10 classes:

> Basically what we are trying to do is within aesthetic education. That is the way we have sort of targeted the music programme, to ensure that all boys have an understanding of how music works and the structure of music and in

> Year 10 what I specifically do is I use the tools in 'Garage Band' for the majority of the boys who haven't got specific musical technical skills of composition.

Mr Organist went to considerable lengths to describe much of the use of digital technology in his Year 10 class being connected to his desire to provide an 'aesthetic' education in music. Mr Organist's interpretation of 'aesthetic' is based on listening to a wide range of styles and genres and exploring how music is constructed using the elements of music as a framework to help guide this understanding. In such an approach, students are guided in their listening to listen to see how melody, harmony, rhythm and other elements of music are used in the construction of a particular piece. This statement refers specifically to the elements as just described:

> The students are getting an understanding of music; they are getting an understanding of compositions and the elements that are part of music.

He told me that, as part of the aesthetic education approach, composition and creativity are an essential part of the music programme at School A. He described many of the students as being 'musically illiterate', suggesting they are unable to handle traditional music notation or music theory. Such a description would imply that musical literacy, the ability to read and write music using traditional music notation and understand music theory, is very important to Mr Organist. To help them achieve in the composition tasks, the use of digital technology is an important part of the process:

> The reason I have used GarageBand is because of the loops where they can still understand the structure and what makes music work.

This comment would reinforce the assumption that Mr Organist believes an understanding of how music is organised using Western music structural devices is important. Further support for this assumption came from the number of specific references to the elements of music and students learning about how music is constructed via activities they engage in using digital technology in the classroom:

> They can still understand the structure and what makes music work … a good way of covering things in the curriculum, also covering specific skills, without them actually realising what skills they are using ... So they actually see what the components are that make up music.

One of the approaches described by Mr Organist to teach students about the elements of music is using authentic composition activities. He described a unit of work that looked at music used in advertising. As part of the unit the students have to create their own advertising jingle and to do this they use GarageBand. He had this to say about how he perceived this activity as being useful as a way of broadening their understanding of how the elements of music work:

> They do various layering processes where they have just got to have a rhythm section and then layer it accordingly. So they come up with some fantastic things. They do … one of their units is advertising so they have to write a jingle, they have to do all the backing for a jingle and it has to be 30 seconds long. So, there are all of the parameters of what you would do with a normal composition class except they are doing it in this way.

One may be able to speculate as to the reasons Mr Organist has adopted this aesthetic approach to music education. Earlier in this chapter, I discussed the expectations that the teachers described being placed upon them and how they appeared to be required to continue the traditions of music education at this school.

These expectations, from parents, senior management and other members of the wider school community may be examined as part of field, habitus and cultural capital, as identified by Pierre Bourdieu (1977). Habitus can be interpreted as 'tastes, habits, norms, values and traditions of a particular society and community or likeminded agents' (Bourdieu & Passeron, 1990 p.75). It can also be considered dispositions to thought, action, understanding or perceptions that an individual acquires as a member of a particular social group or class (Moore, 2012). Of relevance in this case is that Bourdieu and Passeron (1990) maintain that such dispositions operate at an unconscious level yet can have a profound effect on the way an individual and group experiences and responds to the world or social environment. In other words, students at School A maybe enculturated towards knowing and understanding skills associated with the Western classical tradition at the expense of the skills they may have developed previously from prior music education experiences be they formal or informal (Moore, 2012). These skills may allow them to participate in a shared discourse concerning music and other related arts with others who have been part of the community surrounding School A.

Mr Violinist described a more focused approach on learning about the elements of music when using the music software Sibelius in Year 9 classes. He was quick to point out that he did not use GarageBand to the same extent as Mr Organist, as his priority was to teach the students about traditional music notation and basic music theory. Sibelius was developed as a piece of software to facilitate computer-generated music publishing. This software has become the industry standard for publishing computer-generated scores and is used by professionals in the music industry and in educational institutions throughout the world. It is ideal software to use to teach music notation.

Mr Violinist said that learning to read music was a very important part of the music programme and he talked about how he uses Sibelius to achieve this:

> With Sibelius the benefit for me is that it actually gets them using traditional notation or tab [guitar tablature] they can use as well. This is the best one for me, because that is my aim in Year 9.

His focus on developing an understanding of the elements of music and traditional music theory skills is further illustrated in his description of how he structures composition activities using Sibelius:

> First, the students get a piece of music that they have to copy on to the screen. That gets them to find out what the notes … how to input and the next one has a set of words they have to put in as well so it gets them used to writing in the text, the lyrics.
>
> Later on I go to three compositions, one they are given one rhythm and they have to add pitch, the next one they are given pitch and they have to add rhythm and the third one is free but they are given titles and they have to create a piece of music that reflects the titles.

As mentioned in the introduction to this chapter, a teacher's practice is informed and influenced by a range of contextual factors. These may include background, training, professional experience and personal intentions and beliefs. Mr Organist and Mr Violinist have traditional music education backgrounds. They were trained as music educators at a time when a modernist philosophy of music education was prevalent throughout the world. Such a philosophy places considerable weight on understanding how a piece of music is constructed by looking at the framework via musical elements. The elements of music are usually broken down into melody,

harmony, rhythm, texture, timbre (sound), dynamics and form. By examining the elements one by one, a person is able to develop an understanding of how music is constructed and often why it sounds the way it does and how it is perceived as being an effective piece. While at School A, I observed music lessons that focused on developing an understanding of the elements of music. In the Year 9 classes taught by Mr Violinist, the students used Sibelius to develop their skills with basic music notation, learning about aspects of music theory and developing basic composition skills following a pre-constructed formula. In Mr Organist's classes, I observed students using GarageBand when working on more creative and authentic composition activities. Although there was a greater level of creativity included in the task, a strong focus was retained on developing students' understanding of musical elements. When I asked about lesson content, the teachers said that they have prepared such lessons for most of their respective careers and it would appear that this remains uppermost in their beliefs as to what is important when teaching music.

6.3.1 Different approaches to traditional activities: Pedagogical change.

Despite saying that having an understanding of different styles of music and how they are constructed using the elements of music is of high importance to him, Mr Organist is aware that learning about traditional music theory is not seen as particularly relevant for many of the students in his Year 10 classes. He made numerous comments about this:

> They have no understanding of the theory of music or when I say no, they have been exposed to it, but for them there is little relevance. I think there is a bigger picture than spending all the time trying to get students to read crotchets and quavers. I could spend a whole year teaching kids theory of music, as used to happen in this place, but what am I achieving?

Mr Organist tries hard to make things as interesting as possible for the students in the Year 10 class. As discussed earlier, he works hard to bring authentic activities into his Year 10 classes. As a result, he tries to connect the work his students do in the classroom with activities that would be similar in the outside world. One such task is the work the students do as a group when creating a jingle as part of a unit examining how music is used in the advertising industry. In this particular task, he asks the students to imagine they are the creative team at a local radio station and they are required to come up with an advertisement that is going to air in the next hour and they have only 15 minutes to create it. Mr Organist described being regularly 'blown away' by what the 'musically illiterate' students are able to come up with when responding to this task.

He uses GarageBand with the students he describes as 'musically illiterate', as he believes this piece of software allows students to compose effective pieces of music without the necessity for a good understanding of 'musical technical skills of composition'. Mr Organist described using Sibelius with the 'musically literate' students because he said they needed to know how to write pieces using traditional music notation in order to complete the composition tasks in Year 11 at NCEA Level 1. At this level, students are required to present a portfolio of composition work for internal assessment that is notated using either traditional music notation or clearly labelled lead sheets if creating compositions in a jazz or rock style. Even if the students are working in more contemporary genres, the assessment requirements describe the need to have parts of the composition notated clearly using traditional notation.

He described the benefits of GarageBand with the Year 10 class in the context of the 'aesthetic' programme offered at Year 10:

> I think for the musically illiterate students, when we use GarageBand for composition, they get an understanding of how music works. We do a lot of listening and breaking down the piece of music or the ad or the TV ad, so they actually see what the components are that make it up and they have a good understanding from there. I think that is a good way of working.

We know that technology is deeply embedded in the contemporary lexicon of many young people's musical lives and that the internet is their playground (Burnard, 2007). Many commentators have observed that young people tend to have familiarised themselves with ICT innovations before their parents and teachers have, a reversal of traditional hierarchical roles. Mr Organist too, is aware of the high level of exposure students attending School A have had and made this observation:

> We have to realise that there is all this technology out there. Our children have grown up with it, and the kids today, particularly if they have come through pretty strong contributing schools, are very computer literate, know how to use it and expect to use it.

Despite his comments suggesting that the 'musically illiterate' students have some deficit when it comes to understanding music notation and theory, Mr Organist remains amazed at what some of the students are able to achieve using digital technology. He described a multimedia task involving film and music:

> There was one really effective one; where the boys walked through the park, down by the stream, filmed a lot of ducks and they took off because a dog came along and they created that with music—and I was just blown away! They were kids that I would say, are not musically literate. They have got a

> damn good understanding of how music works just using their ear and I think that is something that we, as music educators, don't respect that much.

When describing the work the students completed in this example, Mr Organist once again referred to the elements of music with respect to how the students had constructed the piece using a traditional form with separate sections that could be clearly identified. It could be argued that the students were able to do this as a result of the guided listening they had done in their music classes prior to undertaking this particular activity. This guided listening, informed by the aesthetic approach to music education, reinforced concepts of structure and form and in this example the students had used the technology available to them to demonstrate their knowledge and understanding of these concepts when they constructed the soundtrack, even though Mr Organist described them as not 'musically literate'.

In a review of relevant research literature on ICT use and pedagogy, Way and Webb (2007) suggest that much of the material reviewed generally distinguishes between practice involving teacher-centred approaches and practice involving student-centred approaches. The transition to more student-centred approaches at School A by both teachers appears consistent with some of the findings from this study.

Both Mr Organist and Mr Violinist described working more and more in that mode. Mr Organist said this:

> There will be some lessons where I would say, for example, very little to the class at all. I greet them, the roll is taken, you know what you are doing, and then 50 minutes later we are summing up and you are looking at what they have done. There has been huge engagement.

Mr Violinist echoed much of what Mr Organist said with this statement:

> In some ways, it has become me, being more a facilitator rather than a teacher at times. You sit back and you watch them do the work and try not to intervene too much.

In their responses to the initial questionnaire, Mr Organist and Mr Violinist both indicated that they thought that the students coming to School A were used to using a wide range of digital technology both at home and at school. They showed an awareness that many of the students had been exposed to software such as GarageBand at previous schools and may well be expecting to use it at School A in their music classes. As director of music, Mr Organist had made a considered decision to include a range of activities using digital technology in music classes at School A. The perceived change in pedagogical approach described by both teachers could be explained by this decision. As a result of considering what the students were used to using, and a music programme that has a strong focus on teaching traditional concepts using digital technology, students at School A spend a significant amount of time working without a high level of teacher intervention.

6.3.2 Listening to music.

Numerical data gathered from the students at School A showed that 75% (n = 89) of the students indicated listening to music was their favourite activity in music classes. This was not surprising given that Mr Organist has described using an ‘aesthetic’ approach and exposing the students to a wide range of styles of music was seen by him as very important. This particular approach to music education, championed by Bennett Reimer grew from the ‘music appreciation’ movement in the late 1880s in the UK and the US when it was suggested that music should be popularised. At that time, it was thought students should be given access to ‘great’ pieces of music via gramophone records or radio broadcasts. An important part of this

process was the growth of some form of musical discrimination through a greater understanding of the artist and the nature of their work (Durrant & Welch, 1995; Koopman, 1998). At School A, Mr Organist has extended this particular approach to include a range of styles and genres and in particular, with the Year 10 classes, he explores how music is used to support other media. One example is how music is used to support action or emotion in film. Another example, which he referred to often, was how music can be used to create effective television advertisements. This very focused and guided approach to listening breaks down the music into the various musical elements as previously described. Using this approach, he believed the students would be able to both develop an appreciation for wide range of musical styles and a growing understanding of how music is constructed by exploring the elements involved. Such an approach, he hoped, might influence their listening at home and in other situations they may encounter, such as attending classical music concerts and other similar events.

In the student group interview, frequent references to enjoying listening music were made. The following responses came from a question about what they enjoyed doing in music at school:

> I like to listen to music and learn about composers and stuff. We do a worksheet about them and I like following the scores because we get scores and we follow them while we listen. (Student 2)

> I like composing and recording and I like listening to different types of genres I wouldn't otherwise listen to. (Student 4)

Further references to listening to music came from the students when asked about what they used their computers for at home:

> I listen to a lot of music on my iPod and on my computer through speakers basically all the time. (Student 1)

> I usually listen to music on my laptop or plug it into my speakers while I am doing my homework and stuff. (Student 2)

> I get a lot of songs on iTunes so I am never doing homework without listening to music. (Student 5)

In these situations, the students described listening predominantly to a range of contemporary genres.

Mr Organist also made a number of specific references to the aural skills that he observed students using in many of the tasks they had to complete. Once again, his interview transcript contained a number of references to these skills:

> They have got a damn good understanding of how to use their ear. They have this ability to of just being able to create things because they are living in a very aural world. I see the kids around here creating music in an aural way.

Many researchers have written about the importance the young people place on listening to music (e.g., Hargreaves & Marshall, 2003; Lamont, 2002; North, Hargreaves & O'Neill, 2000; Sloboda, 1999, 2001). Others, such as Green (2001, 2008) have explored how musicians working in the contemporary music industry use their listening skills to learn how to play particular styles of music without reference to musical scores. As a result of the numerous statements he made about the aural skills the students appeared to possess, Mr Organist acknowledged that although he was trained to teach aural perception as part of his education as a music teacher, the skills that many of the students are demonstrating are not easily measured by traditional methods of which he is most familiar. Mr Organist has been involved as an

examiner for NCEA Level 1 Aural paper and in our early discussion raised a number of issues surrounding the teaching of aural skills as required by this external examination. In this Achievement Standard, students are required to transcribe rhythmic and melodic patterns, identify the chords in a chord progression and be able to annotate a score using traditional music notation and demonstrating knowledge of music theory. He described being surprised at the low level of achievement by many candidates from across the country in this examination while, conversely, often being amazed by the aural skills that students in his classes demonstrated. Mr Organist was becoming increasingly aware that these skills that many of the students he worked with appeared to possess could not easily be measured using the traditional assessment methods described above. As a result, he was starting to use digital technology in a manner that allows the students to utilise these skills to demonstrate their creativity instead of focusing on a more traditional approach, which would place more emphasis on transcription of melodies or rhythms:

> If I did the normal things I would be putting barriers in the way all of the time. So for me, it is better to have the kids engaged and creating some really positive stuff, stuff that would blow you away!

This represented a change in emphasis by Mr Organist. Previously, he may have placed considerable emphasis on teaching students how to transcribe melodies, rhythm patterns and identify chord progressions, as these are the skills usually taught as part of developing aural perception. Now, it appears he is allowing students to use the skills they possess as part of a creative process, which the technology available facilitates, allowing the students to use their aural skills in a way that is more interesting and motivating for them.

6.3.3 Technology and composition.

Digital technology allows students at all levels of musical experience and knowledge to compose (Crow, 2006; Odam, 2000), as the process of creating music via available digital technologies no longer is dependent on notational literacy when using sequencing software such as GarageBand where students have access to pre-recorded loops. For tasks that require notated scores, dedicated notation software such as Sibelius is used on a regular basis in music classrooms internationally and locally. Mr Organist and Mr Violinist are typical of many music teachers working in schools in New Zealand. They are both competent musicians with a strong background in Western art music. These teachers discussed the importance of students knowing how to use Sibelius and at School A, students in Year 9 are introduced to music notation using this particular piece of software. Mr Organist explained how they used it as follows:

> Mr Violinist uses it with everybody and how he uses it is, he gives them some stuff to copy out and put in, so it is really just a transcription tool. And they do compose, I think they do fanfares and things; he will talk to you about those. Again, that is reinforcing the theory side of things. That is where we felt that the juniors needed to have some understanding.

Mr Violinist described his use of Sibelius this way:

> We use Sibelius in Year 9, just as an introduction. We use it by putting in, copying … where by, we give them a piece of music and they copy it in and later on they do some composing where they copy and paste and they have to put in their own version and add a free part for their own … that's three fanfares. With Sibelius, the benefit for me is that it actually gets them using traditional notation or tab they can use as well. That is the best one for me,

> because that is my aim in Year 9. One of my aims is to actually just get them to read a bit of music.

The students at School A had been exposed to two different examples of digital technology in Year 9 (Sibelius) and in Year 10 (GarageBand). The students had this to say about how they perceived the use of both:

> I just like learning how to use it and all of the shortcuts and everything you can do on it because it is so quick. We have been just writing down music off a book, and just copying it down into Sibelius and learning all of the shortcuts. (Student 2)

> I just like … you can mix lots of instruments. I like that full feel of music that you get afterwards. You can learn like bass chords off GarageBand because it has riffs and that. I can take them and try to copy them to play in my own music. (Student 3)

Mr Violinist felt that Sibelius was the more useful of the two pieces of digital technology used on a regular basis at School A although he did describe what he felt was some useful purpose for GarageBand:

> With GarageBand it is instant and they really can't go wrong and so they can get something up that sounds good to them and can see some structure to what they have done.

However, he qualified this statement with the following:

> It is useful but, not as a creative tool, I don't think. Well they can create their own pieces, but they are not starting from scratch, which I think some of these boys need to do.

Mr Organist had this to say about Sibelius:

> Sibelius is a great piece of software and I think it is great but we are getting more and more students who want to create in a sequencing programme and Sibelius is not suitable for them. For the guitar kids, the rock kids—it is just not suitable.

Such comments reinforced the impression that I gained of the differences between Mr Organist and Mr Violinist. While both had come from a traditional classical background with qualifications at tertiary level in Western art music, Mr Organist was starting to recognise that many of the traditional methods for assessing musical ability appeared to be inappropriate for a number of the students he worked with. A possible reason for this was related to the special situation at School A. It is very unusual to have an entire year group continuing to have a music class in Year 10. In most schools in New Zealand, music at this year level is optional and is usually selected by students with prior instrumental experience. As Mr Organist explained, many of the students have little or no interest in learning music theory or notation after their initial exposure to the activities prepared for them in Year 9. The students who had received prior musical tuition, particularly on traditional orchestral instruments, piano or voice appeared to be more comfortable using Sibelius as music notation has more meaning for them. For many other students without this prior knowledge, the activities prepared for them using Sibelius appeared to be lacking any relevance to them.

As a result, Mr Organist had developed a range of activities using digital technology that placed the emphasis on creativity without the necessity of students having a high level of understanding of traditional music theory and notation. He had identified creativity as being more important than knowing about such concepts and although he still expressed the opinion that knowing how music was constructed via

the elements of music was important, his way of getting the students to develop and knowledge and understanding of such things was via activities that did not rely on prior knowledge of these concepts. The digital technology available to the students allowed this creativity, the tasks was designed to be authentic and, as a result, I too observed the students achieving some remarkable results, which included some complex pieces that demonstrated a good understanding of contemporary compositional techniques in a range of styles including hip hop and contemporary rock.

In contrast, Mr Violinist had as his priority learning to read and write music using traditional music notation. This was very important to him and he used Sibelius in order to achieve this. Once the students had learnt to use the software by copying and inputting notes from a pre-prepared task book, they progressed to a simple composition activity following a ‘compose by numbers’ approach. Observing the students while completing the task proved interesting. A high level of focus and engagement was observed and it soon became evident that the production of an artefact, in this case a sheet of printed music, provided a great sense of achievement for many of the students. The composition activities were achievable by all the students provided they followed the instructions provided carefully. In this case, some of the students demonstrated more creativity than others did and some elements of frustration appeared, as some students were less than enthusiastic about having to follow the rules and just seemed to place random notes anywhere on the lines of the staves provided for them in this activity.

6.4 Emerging Issues

In seeking to present a series of preliminary findings from the School A case study, I am going to identify four issues that emerged from my detailed investigation of what occurs in music classes at this particular school.

The first of these is the aesthetic approach adopted by Mr Organist as director of music at School A. The first thing Mr Organist said to me in his interview was that he had adopted an aesthetic education approach for classroom music at the school. This approach is grounded in a philosophy of music education that some commentators have described as coming from positivist taxonomy (Dunbar-Hall & Wemyss, 2000a; Elliott, 2001). Elliott (2001) describes this approach as one based on the writings of Susanne Langer (1942) and championed by, in his opinion, Reimer (1970) and Swanwick (1999). Elliott (2001) argues this philosophical approach arouse out of a modernist view of music that sees music as 'a unitary concept (i.e. music is an autonomous world of pure, sublime, sound patterns); that can be evaluated by the same universal criteria; that all 'great works' exhibit these 'purely musical' qualities and that European 'classical' music is the source of most (if not all) great works of music' (p. 35). Elliott (2001) argues, many music teachers have been 'taught to organise lessons in terms of concepts of musical elements' (p. 36).

Mr Organist and Mr Violinist completed university courses in Western art music and were trained as music educators in the early 1980s. They would be familiar with the aesthetic philosophy of music education that was popular at that time, which suggests that all genres and styles of music can be understood by reference to a set of musical concepts or elements (melody, harmony, rhythm texture, timbre, dynamics and form). These teachers made numerous references to the importance of students knowing about traditional music notation and music theory and they have used digital

technology to assist develop this understanding by the students. References to the importance of an understanding of traditional notation first appeared in their responses to the more general questions contained in the teacher questionnaires and then in their separate interviews.

Mr Organist was aware of the use Mr Violinist made of Sibelius. Mr Organist told me that he felt it was important that all students in Year 9 used that particular software package as a way of learning about traditional music notation and related music theory. He said that an initial exposure was important in case the students decided to elect to study music at NCEA Level 1. He acknowledged that for many of the students in Year 9, this knowledge was not particularly useful, as they had no real interest in studying music in the senior school. However, some basic knowledge of how to use Sibelius was important, he said, because that was the software they used to produce notated scores for composition work in NCEA at all levels. The students who played contemporary instruments also used Sibelius and School A had purchased software that allowed rock guitarists to convert tablature into traditional notation.

Since School A had compulsory music at Year 10, Mr Organist had elected to develop activities that encouraged a greater level of creativity by the students than they may have experienced in Year 9. He acknowledged that while he thought a knowledge and understanding of traditional notation and theory was important, many of the students he had to teach in Year 10 did not share his view. It seemed that his way of combining a knowledge and understanding of the elements of music and, hopefully, an understanding of how music was constructed could be achieved using the *aesthetic* approach as described and discussed earlier in this chapter.

Criticisms of this concept-based approach to music teaching and learning as championed by Swanwick (1997) are grounded in the belief that it is a taxonomy

derived from Western analytical thinking (Dunbar-Hall & Wemyss, 2000a). However, on reflection, it seems clear that this understanding of how music is constructed remains uppermost in both teachers' minds. No matter what the task is, the learning outcomes for the students remain as a greater knowledge and understanding of traditional Western art music concepts.

The second issue is that of pedagogical change as a result of the use of digital technology in the classroom. The development and proliferation of digital technology in the music classroom has been particularly rapid over the last decade and its presence, as Pitts and Kwami (2002) predicted, has had major implications for music educators. Many commentators from around the world have discussed how music teachers have adopted and adapted this technology for use in their classroom activities (Crawford, 2009; Crow, 2006; Folkestad, 1991; Odam, 2000; Savage, 2005b; Southcott & Crawford, 2011; Wise, Greenwood & Davis, 2011). The development of the MIDI interface allowing synthesisers and computers to send data to each other led to the development of sequencing software. Notation software was soon developed that interpreted the MIDI data coming from a keyboard and, with editing, could allow direct input of pitches and rhythms on to the screen. Students no longer needed to write their compositions by hand; they could use a range of digital technologies to facilitate this process. In the present day, many computers come with a range of pre-loaded software when purchased. As digital technology has proliferated, computers and other devices are often very visible in primary and secondary classrooms and are used on a regular basis in many subject areas (Hennessy, Ruthven & Brindley, 2005; Roblyer, 2003; Way & Webb, 2007).

The students I interviewed told me they had used a range of digital technology in their music classes at their previous schools. Two of the students I interviewed had

their own Mac Books, the others had a computer available for use at home. Apple desktop and laptop computers have iLife software pre-loaded so subsequently those with Apple computers had GarageBand available for them to use. These students knew how to use such software, they knew how to find information related to musical activities on the internet and they told me that they expected to use digital technology while attending School A.

In this case study, Mr Organist and Mr Violinist acknowledged the high level of use of a range of digital technologies by the students at home and at school. These two teachers used the computers available to them and loaded with suitable software, to develop a range of activities that they believed would allow the students to develop traditional music skills and understanding that both considered important. As a result, they identified that they had changed their pedagogical practices. In Mr Violinist's classes, he used Sibelius to teach the students about music notation and basic theory. In the past, he would have probably used a range of techniques to do this including writing music by hand, completing task sheets that might have contained traditional theory exercises such as identifying note names and rhythm patterns. He may have also used any one of a number of music theory textbooks that I observed on the shelves at the back of his classroom. Now, he uses Sibelius as the vehicle by which he teaches these skills. As a result, in this change of approach, he acknowledged that the students are usually very engaged and focused when using the computers completing the various tasks he has prepared for them. He also told me that as a result, he does not have to interrupt the students when they are working or spend a great deal of time keeping the students on task. I observed this too. There was a high level of focus and engagement by the Year 9 students in the class I observed as the student completed the tasks set by Mr Violinist.

Mr Organist took this approach one stage further. Although he agreed with Mr Violinist that they were required to teach students basic music notation and theory in Year 9, by the end of the year a number of the students were still unable to write music using traditional notation and had no real interest in music theory. As a result, in Year 10, Mr Organist did not place such a strong emphasis on notation and music theory. Instead, he used digital technology and GarageBand, in particular, as a tool whereby students could complete tasks that allowed the students more freedom and more creativity when engaged in them. He tried hard to develop tasks that he felt were more relevant and more authentic. Although he still believed that an understanding of how music works as informed by an understanding of the separate elements of music, this change in focus represents a compromise he has made to try to keep the students engaged in activities in the classroom.

One example of how Mr Organist does this is where students are allocated into a design team that works collaboratively to create an advertising campaign for a particular product. The students are given a particular project to work on and have to work together using the various strengths within the group to come up with an advertising jingle to market their particular product. The students use GarageBand to do this and are free to use any of the sequencing features, pre-recorded loops and some of the other features such as sound effects when composing their piece. While acknowledging that his focus remains on developing an understanding of the elements of music and how music is constructed, he has created tasks that seem *real* to the students and, as a result, he reported a high level of engagement by the students, which I also observed. The students were engaged, they problem solved either individually or with peers and Mr Organist's role was one that was very much supervisory. He told me that he could have taken a more formal or teacher-centred

approach to teaching the Year 10 classes, as was done by a previous director of music, but he felt that such an approach put barriers in the way of the students. He had changed his pedagogical approaches as a direct result of the technology available to him and the students.

The third theme I wish to discuss is concerned with the amount of music the students listen to and how their aural skills appear to be highly developed. Numerous writers have discussed the importance young people place on listening to popular music (Crow, 2006; Green, 2006, 2008; Hargreaves, Marshall & North, 2003; Hargreaves & North, 1999; Savage, 2003; Sloboda, 1999, 2001). It could be argued that children and adolescents' present-day lives have been overtaken by media culture, which can be broadly defined to include music, film, electronic games and the internet (Lerner, Brown & Kier, 2005; Prensky, 2001, 2005). The content of this media may provide models for identity development and may influence the way children and adolescents view themselves and the world (Bosacki, Francis-Murray, Pollon & Elliott, 2006). Listening to popular music is one example of a leisure activity that plays an important part role in the lives of children and adolescents. The omnipresence of music in children and adolescents' lives is evidenced in the technology of CD and MP3 players, and the prevalence of music on computers, television, movies, videos and electronic games (Lerner et al., 2005).

Mr Organist spoke at length about the aural skills students at School A have developed as, he believes, a result of the amount of music they listen to on a regular basis. In many ways, his discourse about aural skills and the teaching of aural skills was one of the most interesting issues to emerge as part of this case study. Mr Organist had been a national examiner for an external exam that endeavoured to measure students' aural skills. He described his concern at the low achievement levels

in this exam across the country yet at the same time talked about the high level of aural skills exhibited by many of the students he worked with. He was clear that the students had great aural skills; it just seemed to him that either the teachers working with students across the country did not teach students effectively enough so they could achieve in the examination or the traditional methods used to measure these skills were inappropriate for the type of student now studying music in secondary schools.

I raised these issues with the students in the group interview and they reinforced much of what is in the literature surrounding the amount of music young people listen to and how they do use their aural skills in both performance on instruments, for example, listening to a song they might like and working out the chords using their ear or in composition by knowing how a particular style of song is structured and replicating that if required. I observed a number of students discussing how a particular piece they were working on using GarageBand would sound if they changed a particular rhythm pattern, or included a different bass riff or added a new lead guitar part. Their ears were their most useful tools and in these discussions, I heard constant references to songs they had heard and how they were trying to replicate a specific sound or style. Mr Organist described observing such discussions too and we often talked about how good the students' ears were.

Bolden (2009) describes similar findings in his study of a teaching composition in a secondary school in Canada. Bolden quotes the teacher in this case describing how the concept of voice leading works where the notes of a melody support a particular chord progression. The students working on a composition task had found this via a process of trial and error. The teacher tells the class that 'your ears sometimes are the best judges' (Bolden, 2009, p. 143).

As with Mr Organist, the teacher working with the class in the case Bolden (2009) describes was not interested in teaching notation and theory as the most important learning outcome in the class. The teacher in Bolden's case said that he was more interested in the students learning about aspects of musical knowledge heuristically. He encouraged them to use their ears to judge whether what they had written using digital technology sounded correct. If not, he worked with them to diagnose the particular problem and then fix it. By working in this manner, if he found something that he felt the whole class should know about he would then get the attention of the whole group and highlight this particular point (Bolden, 2009).

The final issue I wish to discuss is the use of digital technology to facilitate composition. One of the most common uses of digital technology in music education is to support activities in composition (Burnard, 2007; Crow, 2006; Odam, 2000; Odam & Patterson, 2000; Savage, 2005a). Advances in digital technology, in particular coming from the world of popular music have had a profound effect on music education and the priority afforded composition and the fresh approaches towards its teaching (Dunbar-Hall & Wemyss, 2000a, 2000b; Folkestad, 2006; Nilsson & Folkestad, 2005). School music curricula around the world have been developed to place a greater emphasis on composition giving it equal status along with 'listening' and 'performing' (Crow, 2006; Dunbar-Hall & Wemyss, 2000a; Pitts & Kwami, 2002). Digital technology allows students of all levels of musical experience and knowledge to compose, as the process of creating music via available digital technologies no longer is dependent on notational literacy (Beckstead, 2001; Crow, 2006; Dunbar-Hall & Wemyss, 2000b). Sequencing software such as GarageBand allows students without this notational literacy to create substantial and complex works.

Mr Organist acknowledged that composition has an important place in the New Zealand curriculum. He has made sure that composition skills are taught at both Year 9 and Year 10 levels. Mr Organist and Mr Violinist both use digital technology to teach composition. Mr Violinist has very much a 'paint by numbers' approach with simple tasks that provide students with limited choice but the tasks he has developed do become increasingly complex as the year progresses. Students who are able to read and write using traditional music notation are able to create some quite effective pieces of music. However, for those students who prefer to work in more contemporary genres or who play instruments used in contemporary music appeared to find these tasks less than useful for them. As Mr Violinist observed, some students just entered notes of any length or pitch anywhere on the stave without any real reference to how they might sound. For these students, such a formal approach to composition using traditional notation was neither relevant nor particularly interesting to them.

Psychologists such as Piaget (1974) believed that the learner must be engaged in real learning. Constructivists take this concept further by suggesting that the learning environment should contain a meaningful context, one that brings the real world into the classroom (Brown, Collins & Duguid, 1989). Brown, Collins and Duguid (1989) argue that many of the activities that taking place in classrooms in schools make little sense to the students as they 'are simply not the activities of practitioners and would not make sense or be endorsed by the cultures to which they are attributed' (p. 34). While the exercises that the students complete in Year 9 music classes are described as composition by Mr Violinist, it could be argued that they bear little resemblance to the kind of composition activity most of the students would prefer to engage in. In reality, although he describes them as composition tasks, Mr

Violinist himself says that really they are designed to teach the students about music notation and basic music theory. Moreover, by carefully structuring the activities by providing rhythms and pitches, he may be seen to be limiting the creative potential that the students may possess. Wiggins (1999) describes how many teachers 'design restrictive assignments in an effort to make the project easier for their students' (p. 31). She argues that by doing this, the teacher is actually asserting their control over the situation and may 'ultimately restrict their students' creativity' (Wiggins, 1999, p. 32). Wiggins suggests that a better way of approaching a composition task is to try to avoid focusing on specifics in the initial stages and look more at broader, more holistic decisions. These initial decisions, in her opinion, should be more *real* or more authentic. Even students at a very young age have a good conceptual understanding of what a song is. She believes by allowing students to use what they bring to the classroom, particularly in composition, provides a greater sense of ownership and investment in a particular task (Wiggins, 1999, 2007).

Mr Organist's approach was to use more 'authentic tasks', as he described them, and allow the students to work with GarageBand rather than Sibelius. Although making a number of references to traditional music concepts, he did acknowledge that to him, the most important function of this sequencing and looping software was to facilitate the students' creativity. He had discussed at length the aural skills of the students and acknowledged that their ears were so good that in his opinion they did not need to know about traditional theoretical concepts in order to create effective pieces. Knowledge of chord progressions and structuring devices appeared to be something that the students already possessed. He believed that the students knew how to construct effective pieces of music because they had listened to so much music and could replicate what they had heard using the software available to them. The

students discussed their work critically and had the ability to change parts that did not sound right and add other parts to enhance what they had created. They could do this with the software that allowed them change parts or add parts without needing to know how to write these new sections in traditional notation.

Within the music education research community, there has been considerable discussion and debate between those who support the use of technology in music education and those who do not (Savage, 2012). Espeland (2010) discusses the technology/non-technology dichotomy in his keynote address to the Research in Music Education Conference in 2009 and draws a parallel to the debates that have occurred around the priority of 'playing by ear or notation-based music education' (p. 129). He describes how critics of technology in music education have often focused on its perceived negative aspects, the basis of which seem to be as follows:

> Many music educators consider the essence and qualities in music education to consist of practical, aesthetic, and expressive activities involving body and mind; feeling as well as rationality. (Espeland, 2010, p. 130)

Conversely, proponents of technology have focused on the central position of technology in different kinds of music production and communication and have argued that this development should be reflected in modern music education. As Espeland points out, a number of commentators supporting the use of technology in music education say that technology can be a vehicle that facilitates the potential of individual learners both in terms of realising their musical ideas as well as intentions in performing and in social and musical communication. Music technology, these commentators suggest, is connected to a future of music education that gives more people access and the opportunity to become musically active and educated (e.g., Ashworth, 2007; Savage, 2007, 2010; Webster, 2002b, 2007).

Leong (2011) discusses the emerging futures in the twenty-first century and the effect technology has had on nearly every aspect of life including communications, medicine and education. As part of this discussion, Leong explores some of the possibilities recent developments in digital technology can offer. He focuses on the changes that are occurring in education and the way that the current generation of students may learn. He identifies interactive digital media as an important component of their learning and quotes the White Paper 'Equipping Every Learner for the 21st Century' (CISCO, 2008), which suggests a radical shift to a new educational paradigm that takes into account the changes taking place outside the school gates as well as catering for the needs of twenty-first century learners. Music education, according to Leong, should be part of this new paradigm and should give more attention to learners who, in the past, were underserved by an exclusive music education agenda that placed considerable weight on the importance of traditional concepts such as notation and music theory as identified in this case study. New approaches in music education may include activities that value both individualised and group learning; an integration of music and the arts into the daily life of learners and extending this beyond the school setting; utilising gaming and 3D technologies and creating immersive environments and containing a balance of physical, cognitive, metacognitive and social elements (Leong, 2011).

Although Mr Organist often referred to many students being 'musically illiterate', this was not usually meant in a pejorative manner. My interpretation of his comments was a growing realisation by Mr Organist that although the students may not be literate in terms of reading and writing music, many of these students possessed a range of skills that they had developed as part of being immersed in a world of sounds and images quite different to what he had experienced at their age. In

other words, the students possessed a high level of digital literacy. He acknowledged this difference and was prepared to work in a manner that he felt empowered them by recognising these skills and designing tasks that demonstrated many of the approaches advocated by Leong. With the Year 10 music classes, Mr Organist has prepared activities that are both inclusive and enabling. The students are using digital technology in a way that is familiar to them.

6.5 Summary

This chapter describes the perceptions of and responses to the use of digital technology by teachers and students at School A. This chapter provides evidence that the two music teachers are using this technology in a way to teach students about what they consider is important about music, while at the same time acknowledging that they are working with students that have a high level of experience using digital technology at home and at previous schools. The students have an expectation that they will continue to use digital technology in classes at School A. While the two teachers are both experienced teachers with a background in Western art music and are used to working with a traditional formal music education pedagogy, these teachers are demonstrating the beginnings of pedagogical change. They have worked to introduce tasks and activities they believe are more relevant for the students while at same time continuing to work to provide what they feel is required by the national curriculum and the demands of the special nature of School A.

In this chapter, I highlighted four issues that have emerged from this case study. I wish to draw attention to two of these, which I will continue to focus on in subsequent chapters. The first issue relates to the philosophy of music education as described by Mr Organist. Mr Organist described the activities the students complete in music classes as being based on the *aesthetic* philosophy of music education

championed by Reimer (1970, 1989a, 2005). This is reflected in his numerous references to the elements of music and his emphasis on listening to music. In the following chapters, I will describe cases where teachers have a different philosophy and as a result, have different approaches to teaching music in their respective schools. The second issue is how the teachers in this case are using digital technology in the classroom to support their philosophy of music education, the requirements of the national curriculum and their own beliefs about what is important in music. In subsequent chapters, I will discuss how teachers in the other three schools are using technology in their teaching and focusing on the approaches they are taking when teaching composition using the digital technology available to them. In doing so, I am endeavouring to show some of the similarities and some of the differences in the way the teachers and the students are responding to this within the context of their particular schools, their own music education backgrounds and the context of the New Zealand curriculum.

Chapter 7: Case Study 2: School B

> Kids are so hooked into technology. They are so hooked in and I just know from being a parent, I have got a son, who is just wedded to his laptop. His laptop is part of him and his laptop and his phone and iPod and that is his world and that is his friends' world as well. That is how they communicate with each other, and it is just something that I think that, it is only a tool—but it is a way to hook them in. (Ms Singer, School B)

This chapter presents an overview of the range of musical activities offered at School B. Among the four schools involved in this study, School A and School B are the most similar. In Chapter 6, the importance of context was discussed and the two teachers were situated in terms of their teaching philosophy, professional training, experience and personal interests. In this chapter, I discuss the choices and perceptions surrounding the use of digital technology made by the teachers and the perceptions of digital technology of the students in the context of the musical activities offered at School B. Again, I situate the teachers in terms of context of the school, philosophy of music education, professional training, teaching experience and personal interests.

7.1 Introducing the Music Department and Music Teachers at School B

The music block at School B is located adjacent to a small drama theatre with a courtyard separating the two buildings. The main teaching spaces are off to the left of the main corridor with six practice rooms off to the right. The larger of the two teaching rooms has space for typical school desks and chairs as well as containing a baby grand piano, drum kit, various guitar and keyboard amplifiers, a collection of marimbas and three tympani. Visible digital technology is restricted to a connection for Mrs Conductor's laptop beside her desk to the data projector suspended from the

ceiling. A stereo sound system with CD player is also adjacent to her desk as well as the powered mixer for a small PA system with speakers also attached to the wall.

The second teaching space in the music block is smaller. Located around the edge of the room on three sides are a number of portable keyboards. A similar connection for Ms Singer's laptop was evident beside her desk along with another stereo sound system. As in the main room, a data projector was suspended from the ceiling. At one end of this room was a small office where Ms Singer works when not teaching. On the other side of the office is a purpose-built computer lab. This space has 10 PC computers located on desks arranged in a circle. Each computer is connected to a specialised keyboard that is a combination of a QWERTY and music keyboard. There was plenty of space for either Mrs Conductor or Ms Singer to move easily from desk to desk if students required help while they were working with the computers.

I met Mrs Conductor in her office, which was located directly inside the main entry to the music block. My initial thoughts were that her study space was considerably smaller than Mr Organist's s office at School A. Her laptop was evident on her desk and while discussing what I had in mind for gathering data at School B, she was checking dates seeing where and when both she and Ms Singer would be able to assist with the project. It was evident from our initial discussion that Mrs Conductor went to considerable lengths to be very well organised concerning deadlines for assessments for the students, competitions and other important school occasions. I commented on her level of organisation and she was quick to reply that this was the only way she could do her job as head of music at School B. She said that the expectations placed on her by parents, school management and students was

considerable and she needed to very organised. At this stage, Ms Singer joined us and we discussed the project. Mrs Conductor made the following comment:

> I hope you don't think that we are not doing this well enough. I know there is a lot we can do better but it is incredibly busy and I just don't have time to do all the things I would like to do.

Such a comment reflects the constant pressure that many teachers of performing arts are under in their busy life in a school. This pressure comes from a range of sources. Expectations in independent schools on high academic achievement are constant and come from students, parents and school management. Expectations of success in co-curricula activities are also very high and often the students who participate in these activities may also be involved in sports teams or in other performing arts related activities such as dance and drama. One way that some teachers in schools such as School A or School B cope with such pressures is to focus on one aspect of their job and do what they do best without necessarily challenging themselves to adopt new pedagogical approaches or the latest technologies if such adoption will require many hours of extra work; hours that they feel they can better dedicate to other activities.

After reassuring both teachers that this was not the intention of this project, both appeared to relax and soon became very enthusiastic about the project. Mrs Conductor said that she viewed her participation as valuable professional development, a view echoed by Ms Singer. I had met both teachers previously as my daughters attended School B and were both very involved in a range of musical activities offered by the school. Mrs Conductor has a degree in performance in piano and violin. She takes responsibility for the instrumental performance programme at the school. This includes conducting the large school orchestra, coaching a number of

chamber music groups and coordinating the school jazz band. Ms Singer has a more general music degree but has specialised in voice and choral conducting. She conducts the senior auditioned choir, the junior choir and works as a coach for the barbershop quartets that are formed especially for competitions. There is a strong emphasis placed on practical music making at School B and the number and range of performing groups, instrumental and choral, large and small reflects the time and effort these teachers put into working with the students involved in music at this school. Although School A also has a large number of performing groups, the emphasis placed on performance at School B is visible in the music classroom where performance is a key part of the day-to-day activities for the students.

As our discussion about the project continued, I soon realised that both Mrs Conductor and Ms Singer were very passionate and enthusiastic about the work they do with the students at School B. They began describing work that students had done, at all levels in the school. They described excellent composition work, great individual and group performances by students over the years and how much pleasure they experienced working with many, very talented students. They did express concern about how the new arts curriculum was starting to affect their work and made special mention of how dance was becoming very popular in the school and that there were moves by senior management to increase the hours given to dance in the junior school at the expense of music. This was similar to the discussion I had with Mr Organist and Mr Violinist at School A where they expressed concerns at how hours given to drama at their school may affect music at their school.

Mrs Conductor then described a recent situation concerning a senior student who had recently completed NCEA Level 3 composition. This particular achievement standard is internally assessed and School B was required to submit the work for

external moderation. Mrs Conductor said that she had assessed the particular composition, a contemporary song, as an example of ‘excellence’ and was horrified when the external moderator returned the piece indicating that because it was not notated using formal music notation, it should have been assessed a ‘not achieved’. Mrs Conductor then said she had written to the external examination body complaining that it was nearly impossible to capture the emotional intensity the song contained using traditional music notation and that it deserved to be assessed at ‘excellence’ based on that emotional intensity, the quality of the crafting of the song and the overall impact of the completed work. At this point, she was still waiting for a reply and added that perhaps it was time music teachers reconsidered how composition in different styles and genres was assessed without relying on criteria associated with Western art music, and that perhaps different styles required different assessment criteria.

As with Mr Organist and Mr Violinist at School A, Mrs Conductor and Ms Singer went to some lengths to describe the context in which they worked. Both said that while enjoying working at School B, they found the pressure they were under a real challenge. They felt they had to meet the needs of a range of musical backgrounds ranging from classical to contemporary. They felt under pressure to be seen to be participating in as many local and national competitions as possible and mentioned the national chamber music competition, the Choral Federation choir festivals, the local orchestral festival, Barbershop competitions and regional and national jazz band competitions. On top of all these events, they said they were expected to be involved in not one, but three school musicals; one for the intermediate Year 7 and Year 8 group; one for the junior high school Years 9 and 10; and one for the senior school Years 11 to 13.

7.2 School B

School B is an independent girls' school located towards the centre of the city. It was founded in 1889 and administered by a group of family members for 60 years. The family that initially established the school believed passionately in creating opportunities and independence for young women through education. The founders' belief in the importance of providing young women with a strong qualification and knowledge base, skills and values remains the hallmark of education at School B. As an independent school, School B has the autonomy and flexibility to meet the needs of students and the expectations of the school community. Although required to teach to the New Zealand curriculum, this autonomy includes self-determining its programmes of study at particular year levels, subjects offered, its student to teacher ratios and class size, providing additional support in specific subjects where required, and directing school resources to best support student current and future learning.

Currently, the school has around 700 students in Years 7–13. The school has enjoyed considerable success both in academic and co-curricula activities for a number of years. School B is consistently in the top 3% of New Zealand schools for academic achievement. In 2010, 100% of the students in Year 11 achieved NCEA Level 1, 96% of students in Year 12 achieved Level 2 and 93% of students in Year 13 achieved Level 3.

School B also enjoys considerable success in sporting and cultural activities. The rowing crews from School B have done extremely well in regional and national regattas in the last few years. The auditioned senior choir have been selected for the finals of the Choral Federation Festival Big Sing on a number of occasions in the last 10 years. The Jazz Band have participated regularly in the Southern Jam school jazz band festival and in 2011 received a gold award for their performance. Such successes

reflect the emphasis placed on excellence both in sport and cultural activities and reflect the underlying performance-based philosophical approach to music in the school.

7.2.2 Music at School B.

School B has enjoyed a high level of achievement in both instrumental and choral festivals and competitions during the time that Mrs Conductor and Ms Singer have been teaching at the school. As both teachers said, they feel a high level of expectation by students, parents and senior management to participate in as wide a range of competitions and festivals as possible. Mrs Conductor and Ms Singer work together to provide students as many opportunities as possible to participate in these events. To do this, they work to their respective musical strengths with Mrs Conductor looking after instrumental music and Ms Singer the choral work. Where possible, they include visiting itinerant instrumental and choral tutors to assist with some of the performing groups. Mrs Conductor is a keen supporter of the jazz band but relies on an itinerant tutor to audition band members, choose suitable music and prepare the ensemble for competition work. She also asks other tutors to support her work with chamber music ensembles.

Outside of the classroom, School B offers tuition in a range of classical and contemporary musical instruments. This includes high and low strings, brass and woodwind. Electric guitar and bass guitar are also available as well as orchestral percussion and drums. Tuition is also available in voice, piano and pipe organ. Tutors providing instrumental and vocal tuition at School B come from a wide range of backgrounds. Some have had traditional conservatoire training in Eastern Europe; others have a contemporary music background and have qualifications in jazz and in rock. Mrs Conductor is very keen to offer tuition in as wide a range of instruments,

styles and genres as possible, and has been fortunate enough to have a visiting local composer offer extra tuition in composition for senior students as part of an artist in residence programme supported by the school. This is a good example of where the school can place resources in areas they see as worthwhile and suggests that senior leaders in the school are willing to support the work done by the two music teachers.

The classroom music programme at School B provides compulsory classes for all students at Year 9. Students can also opt for a performance music class at this level. This is unusual, as most schools would offer a performance music class from Year 10 onwards. Music then becomes an optional subject from Year 10 through to Year 13. The content and range of activities undertaken in the junior classes is guided by the New Zealand Curriculum and should include a range of activities including using digital technology where appropriate. Music in the senior school is offered at NCEA Level 1, Level 2 and Level 3 and Scholarship. At School B, Mrs Conductor said most students complete all of the Achievements Standards for Level 1, but at Level 2 and Level 3, depending on the number of credits they already have and their particular musical strengths and weaknesses, they may opt not to do all of the Achievement Standards available to them.

7.2.3 Students at School B.

Many of the students attending School B come from similar backgrounds to those attending School A. In fact, many would have brothers at School A. School B is organised in a similar fashion too, although there is only one, much smaller boarding house. Most of the students attending are day-pupils. Students at School B are organised into six houses that span Year 7 through to Year 13. As at School A, there are a number of inter-house events including a house singing competition.

As with School A, a major attraction for many middle-class families is the small class sizes that are retained from Year 7 through to Year 13. The school goes to considerable length in their marketing material to outline the benefits of this low teacher to student ratio and how this facilitates an excellent teaching and learning environment. One innovation introduced at School B in the 1990s was the development of an Individual Educational Programme (IEP) for all of the students. The students meet with their parents and their form teacher and set individual goals at the beginning of the year. Such goals may include some form of inquiry-based learning strategy or targeting a perceived weakness in a particular subject. These goals are reviewed half way through the year to see if they have met them and to introduce any further strategies that may help. The IEPs are part of the strong focus placed on effective teaching and learning at School B. A member of the senior management team having responsibility for teaching and learning across the whole school reinforces this focus on teaching and learning.

As is the case with School A, the majority of the students attending School B come from a white middle-class background. However, there is a greater proportion of students with Asian backgrounds and many of these students are skilled classical instrumentalists. School B is the only school in this study that can form an orchestra with a large string section as many of these Asian students play either high or low string instruments. Mrs Conductor said that she was very fortunate to have so many students who were competent string players arriving at Year 7, as they could be members of the school orchestra for seven years thus continuing to fill places vacated by students leaving at the end of Year 13. However, despite their obvious skills as instrumentalists, many of these students opted not to take music in the senior school, a fact that both Mrs Conductor and Ms Singer found disappointing. Both teachers

commented that these students' parents were clearly influencing their choices of subjects in the senior school and music was not seen as a good career choice. Such views by parents are not unique to independent schools. Similar opinions surrounding subject choices often come from parents with students attending schools located in high socio-economic areas. Many of these parents fund individual music lessons for their children where skills associated with the Western classical tradition such as music theory, historical and analytical knowledge may function as cultural capital for them allowing them to study subjects at school that are perceived as more worthwhile for their future employment.

The students Mrs Conductor selected for the group interview came from the Year 9 performance music class. Six of the group were from a European background and one was from an Asian family. All of the group were receiving formal music tuition, one identified herself as mainly a singer but said she played guitar at home and had taught herself various chords and songs by listening to them, finding the chords for the songs on the internet and working out how the song went. One of the students was a capable alto saxophonist who played in the school jazz band. Members of this ensemble usually only come from the senior school. Of the other students, one played flute, one played clarinet and one played trumpet. The other two were both violinists.

7.3 Performance Music

School B is in the fortunate position of having two performance music classes in Year 9. This is quite a unique situation, as most schools in New Zealand would have a general music course at Year 9 with music available as an option from Year 10 on. Class size in all classes at School B is small and the luxury of having two performance music classes is not lost on both music teachers. It allows them to

provide many opportunities for practical activities in the classroom when working in groups. Students are able to develop their performance skills, individually and in groups, as part of the course. These activities appear popular with the students:

> I like getting in groups and playing bits of music. (Student A)
>
> I like doing the same things, like having a class orchestra. (Student B)
>
> I like going into groups, but I also like performing because it gives you a chance to show other people in your class what you've been practising. (Student D)

Mrs Conductor and Ms Singer include many practical activities in their respective classes and use a range of digital technology to support these. Both teachers spoke of the usefulness of YouTube in supporting practical activities:

> For example, in chamber music, if I am bowing stuff, we get on YouTube and look for some group that we like the look and sound of, look at their bowing and we write it in. (Mrs Conductor)
>
> We were doing this little picky piece at the moment, dah, dah, dah, dah—like that and then you play the YouTube clip and they see this guy going dum, d-liiiiiiing and it gives them some idea of the complexity of it. They start appreciating what people are actually doing! (Ms Singer)

The students also referred to YouTube when asked about their computer use at home. Student A was a violinist and she said she often searched YouTube to find a particular piece she was going to learn thus she could hear it and to observe the bowing. She said that this made it easier for her to learn a new piece. Student D was a singer and she described doing something similar. In her example, she described

looking at different styles of performance of the same song and when she found one she particularly liked, she would download it from iTunes for her iPod.

Student G described similar activities as well but added that she would often do an internet search for guitar chords and regularly used a particular site that had a large number of songs with lyrics and chords that were useful for her when she found a song she wanted to learn.

7.3.2 Composition.

Composition activities are an important part of the performance music class programme. The students are required to become familiar with Sibelius early in the year. Mrs Conductor described how both teachers introduce Sibelius to the Year 9 performance music classes because the students will need to be able to use it for composition work for all levels of NCEA. Both teachers use different software with their general music classes and they referred to Band in a Box. This program is designed to provide an accompaniment for a soloist and has a wide range of styles and instrumental ensembles available for selection. Typically, a student working with Band in a Box will enter the chords for a particular song into the software and then they are able to select a particular style such as country rock or swing blues. The program then plays the chords with a bass part, drums, piano or guitar, sometimes a combination of both. Band in a Box also allows someone using it to record a solo part over the chord progression they have entered. Again, a variety of sounds are available to the user for this solo part.

Mrs Conductor was particularly enthusiastic about Sibelius and the immediacy it provides students when replaying what they have written:

> Sibelius, well, it is instant, they can hear what they are writing. So for me, it allows them to write far more complex pieces, no matter what the genre is,

than they would otherwise because you can get instant feedback and they are not relying on having to find somebody to play it for you.

Ms Singer described in considerable detail a composition created by a senior student using Sibelius. The student concerned had utilised the copy and paste feature of the software in what Ms Singer considered a very creative manner to layer a number of parts creating a complex texture. Ms Singer said she was 'stunned at the number of melodies and counter melodies happening at the same time' and was of the opinion that the student would not have been able to create such a complex work without that particular feature.

Following on from Ms Singer's description, Mrs Conductor provided her thoughts on how technology appears to enable students without a great understanding of traditional theory and Western harmonic structures to create compositions of high quality. Her first example was of a student who was a singer, a capable performer, but lacking what Mrs Conductor considered an understanding of basic harmony, in this example referring to being able to use a limited number of simple chords to help structure a piece. This student started her composition by creating a melodic idea on a marimba and then transferred this to Sibelius. The software allowed her to manipulate the melodic idea in a number of ways and Mrs Conductor said she was able to create a piece with an unusual chord structure based on the melody. Mrs Conductor was of the opinion that being able to manipulate the melody using the software unlocked the creative process for that student and as a result, she wrote a very successful piece.

Mrs Conductor's second example was of a senior student who was a capable singer-songwriter with only the most rudimentary understanding of traditional theory. She said that this student completed a very impressive portfolio of compositions using sequencing software that allowed her to multi-track her own voice and guitar parts

and add such parts as a solo violin or a marimba. Mrs Conductor said that she felt the sequencing software's multi-tracking capability was an essential part of this particular student's creative processes.

Both teachers expressed some concerns about the composition process using Sibelius as the main tool. Mrs Conductor said that when students are required to start the process of writing a composition, some students immediately go the computer room, open Sibelius and just appear to wait for inspiration. She described how she would often say to these students that they needed to get an instrument and try things first before starting to write music using Sibelius. Mrs Conductor said she sometimes had to remind some students that the creative process did not start when they were using the computer:

> Some say 'oh but I need Sibelius to compose' and I say no you don't, you don't, it is a tool to enable you to take your creativity … because your creativity doesn't start in the computer, it starts in your mind. You have your ideas—Sibelius is a tool to allow those ideas to be heard and come to fruition.

This apparent reliance on technology as a necessary part of the composition process is an important theme and is one that will be more fully explored later in this thesis.

Ms Singer described how some students ended up with pieces that were unable to be performed, by either vocal groups or instrumental groups. She made the point that Sibelius allows students to write vocal parts containing notes that are outside the usual range of the human voice being either too high or too low for male and female voices. She described one particular composition where a student had written piano chords containing 15 notes and as a result was completely unplayable in a live performance situation.

The student responses to questions about how they felt about computers, creating music using computers and how modern composers used computers were all very similar. The students indicated that they enjoyed using Sibelius for composition activities. The students interviewed were in Mrs Conductor's class and were familiar with traditional music notation. They said that they enjoyed the composition tasks they were required to complete. They also enjoyed working on a series of pre-composition activities using real musical instruments before transferring musical ideas they created to the computer. Two of the students said that they would like to be able to buy Sibelius for use at home but found that it was too expensive and as a result had not bought it.

The students' opinions on how modern composers used computers for composition were quite varied. Students B, C and D said they thought that composers who wrote popular songs would be more comfortable using computers and digital technology in their songs. Student D had this to say:

> Composers coming out now will use it a lot more than older composers will because they seem to have a lot more contact with computers and technology.

Student E provided a more considered and more detailed response that included her thoughts about performance and recording techniques:

> I think that they use computers a lot more now, because a lot of the songs you hear, their voices have gone through computers, and all the instruments have as well! So it doesn't sound like it would if it was just the instruments that they were using. Also I think a lot of the … they're not really using as many instruments, it's more of the sounds being made from a computer.

The students in junior classes at School B did not use sequencing software in their work in composition. The composition activities that they were required to complete were designed to introduce the students to Sibelius. This decision was made because the teachers believed an understanding of the functions of the software by the students was necessary because the students would be using it to complete the composition achievement standards if the studied music in Year 11 and in subsequent senior classes. Although Ms Singer discussed using Band in a Box with one of her junior classes, most composition work is designed to be completed using Sibelius.

Student awareness of the use of technology in contemporary music appeared varied. One may speculate as to why this was the case. Some of the students may have had the opportunities to work with sequencing software in contributing schools before they began attending School B. Some of the students may have Apple computers or portable devices that include sequencing software such as GarageBand and have had the opportunity to explore its use at home. Moreover, the students may have differing perceptions as to what a composer does. Those students who are receiving music education based entirely on the Western classical tradition may perceive a composer as someone who writes music only in that style whereas students who receive music education with a focus on more contemporary styles may view this differently. General awareness by the students of the possibilities of technology appeared to be quite high but an understanding of the breadth of possibilities remained varied.

7.4 Emerging Issues

In seeking to present some preliminary findings from School B, I will identify a range of issues that emerged from my detailed investigation of what occurs in the junior performance music classes at this particular school.

The first of these examines the relationships that both Mrs Conductor and Ms Singer have with the technology they have available at School B. Both teachers use a range of digital technologies on a regular basis. One of the first things Mrs Conductor said to me on my first visit was that she was a little concerned that I might consider that both she and Ms Singer were not using technology well enough to support student learning. At this first meeting, I wrote a note referring to the way that Mrs Conductor was using her laptop to keep on top of all the organisational requirements of a busy music department. I commented on this to her and as part of her reply she said that having had five years away from teaching she realised when she returned that much had changed and that she needed to use technology to help her with her organisational skills. She spoke at some length at the demands placed on her by the school, the students and their parents. She was aware that she was expected by each of these groups to meet a wide range of musical requirements that spanned a range of genres and styles. She felt compelled to make School B as visible as possible in local and national school music festivals and competitions. For her, a high level of organisation was required to achieve this and to do this she relied on her laptop and relevant software to communicate with students, instrumental teachers, parents and outside organisations.

An essential part of this organisation was her relationship with the assistant music teacher Ms Singer. This was evident in a number of ways. Firstly, the music department at School B was able to function so efficiently because both teachers appeared to share a similar philosophy of music education that informed their teaching. This shared philosophy was evident in their classroom teaching as they each taught a performance music class and presented similar activities and material to the students in their classes. The only point of difference evident from discussion with

them concerned the use by Ms Singer of Band in a Box with her performance class when she found Sibelius to be too challenging for the students in the group. However, she still worked to reach the same learning outcomes as Mrs Conductor's class. The students in both classes spent a great deal of time performing in small groups and at times, individually. They also worked on a series of composition tasks designed to introduce them to the functions of Sibelius and designed to help them develop skills in composition associated with the Western classical tradition. The only point of difference was Ms Singer used Band in a Box to do this with her class as this software has a notation option that she perceived was easier for the students to use.

This sharing also continued into co-curricula activities. Mrs Conductor took responsibility for all instrumental ensembles and Ms Singer all the choral groups. Finally, both teachers chose to respond to the initial questionnaire together and asked to be interviewed together. In the interview, both teachers built or elaborated on each other's answers thus painting a particularly vivid picture of the way they responded to digital technology and its use in their teaching.

As a result of the shared philosophy of music education by the two teachers, considerable emphasis was placed on performance and as a result learning about music through practical skill development. This approach was quite different to the *aesthetic* philosophy adopted by the teachers at School A. Instead, the teachers at School B have fully embraced the praxial approach as championed by Elliott (1995, 2001) and Swanwick (1999). Elliot's view of music as *praxis* (a combination of music making and music listening) leads him to the conception of the music curriculum as *practicum*. This *praxial* view of music education focuses on music making and in particular, performing. Music listening is not viewed as an end itself but rather is taught in conjunction with music making (Koopman, 1998).

This philosophical approach is reflected in the strong instrumental performance music programme evident at School B. Although both teachers at School B have a background in Western classical music, both teachers have accepted the need to include contemporary music into activities in the classroom and activities outside the classroom. Mrs Conductor is aware that she does not have the skills to direct the jazz band or work with some of the rock bands or rock instrumentalists that are in the school. However, she ensures that by finding suitable tutors for the students, individuals and groups receive the special support they need. One of the advantages of an independent school such as School B is that they are able to have many varied itinerant tutors working in the music department. This is possible because the students pay fees and the number of itinerant tutors available to work at the school is not pre-determined by a government funding formula as it is in state schools.

The students in the performance music classes have many opportunities to play together in the classroom. Although the majority of the students in the performance classes have individual tuition on traditional orchestral instruments or piano, they do have the opportunity to learn simple chords on guitar and be taught basic keyboard skills. The students are encouraged to develop skills on a different instrument to the one they regularly play. The teachers arrange contemporary music for the students to play and often support their teaching with digital technology, either to teach performance skills or augment an ensemble by providing backing tracks for specific instruments. Ms Singer mentioned how useful Band in a Box could be at providing backing tracks for songs she had taught her Year 9 performance class.

Composition was seen as a logical progression from performance. Not only were individual and group performance skills developed but also an understanding of how music worked was teased out by looking at what the students had played and

how it was constructed. Students were then given the opportunity to explore sounds on their own instruments as part of composition pre-tasks before moving to the computers and developing these ideas using Sibelius. Such a process provides evidence that the activity of composition gave the students the chance to engage in a creative process facilitated by the technology available to them (Nilsson & Folkestad, 2005; Savage, 2005a; Swanwick & Cavalieri Franca, 1999).

Mrs Conductor uses a similar approach to Mr Violinist at School A to teaching the students how to use Sibelius in the Year 9 performance music class. While accepting the need to support students with a contemporary background and having alternative software available that would allow sequencing, Mrs Conductor was clear that students in the performance classes who wished to continue to study music in the senior school needed to have a good knowledge of how Sibelius worked. The difference between her approach and that of Mr Violinist was that she assumed that the students using the software could already read music and had a reasonable understanding of basic music theory. Mrs Conductor also described her approach as 'paint by numbers' comprising of writing in three parts, using ternary form, using an ostinato pattern and creating melodic ideas from a pentatonic scale. This task was considerably more sophisticated than those used in Year 9 at School A. Although she had provided some limitations (see Appendix A), students had considerably more scope to create something more original. Mrs Conductor told me that the students with prior experience in reading music and music theory were quite capable of completing the task without any support from her provided they followed the instructions she had prepared. However, she did say that with students with less experience with traditional notation, she would run this particular composition activity more like a whole-class activity.

Ms Singer was particularly enthusiastic about some of the functions that Sibelius can provide and discussed how students are able to use cut and paste to create a range of textures with ease. This ability to manipulate large sections of a musical score allowed students to experiment with textures and the playback feature allowed them to hear what they had created instantly. If they were unhappy with the result, they could easily undo what they had done and could try something different. Ms Singer referred to a particular composition created by a senior student where the student had created a series of melodies and counter melodies forming a very complex contrapuntal texture. Ms Singer said she doubted the student would have come up with this result without the cut and paste function in Sibelius and the opportunity to hear the effect immediately because of the playback function.

In a study of creative thinking processes by adolescents when using computers to compose, Seddon and O'Neill (2003) found there were some distinctive differences between the approaches taken by students with prior experience of formal instrumental music tuition (FIMT) and those students who had none. They found that students who had FIMT tended to write complete melodies as a first event in the composition process and then would harmonise this melody, usually in a fairly traditional manner using a basic chord structure without much experimentation. All of the students interviewed in this case study were receiving FIMT. The student who played saxophone told me she started music lessons on recorder first before transferring first to clarinet and then alto saxophone. This is a very common progression for young wind instrument performers. The student who was having lessons in contemporary singing also told me she started music lessons on recorder and therefore had been exposed to the process of FIMT.

The performance music classes at School B could be seen as limiting the level of experimentation the students might engage in based on their FIMT experience because both Mrs Conductor and Ms Singer were products of traditional Western art music university education. They would have received FIMT for large part of their lives. Seddon and O'Neill (2003) argue that children with prior experience of instrumental tuition seem to be inclined to adhere to musical parameters associated with traditional musical form and structure. From my discussions with Mrs Conductor and Ms Singer, it would seem that these concepts are important to them, along with an understanding of traditional music notation and harmony. Such concepts are valued when assessing composition in the senior secondary school in NCEA. The descriptions published by the examiners regarding how compositions are assessed at specific levels are very detailed and refer to the music elements related to notation, form, instrumentation and development of musical ideas. Both teachers argued that such skills should be developed in the junior classes so by the time the students reach NCEA they are competent users of Sibelius and have the ability to create successful compositions that will meet the assessment requirements of the composition achievement standards. Examples of compositions by Year 11 students from School B shown to me by Mrs Conductor that had been assessed as being at excellence standard showed evidence of all the requirements outlined in the descriptors as having been met.

Of the two teachers, it appeared that Mrs Conductor, as head of department was more accepting of the need to include more contemporary music opportunities for the students at School B. Mrs Conductor said that she was not skilled in teaching contemporary music or contemporary song writing. Mrs Conductor recognised that there were a number of students at School B who were not in the performance music

classes but who were very interested in contemporary music and were highly skilled performers and songwriters. She was keen to meet their needs too and talked about developing a contemporary music course in the senior school. She felt that the current assessment requirements for composition for NCEA tended to exclude students with these skills, particularly as compositions were required to be notated using standard music notation. She expressed some concern that such students were not getting formal recognition for their skills and hoped that by developing such a course, more students would have the opportunity to get some recognition of their ability as creative artists. Mrs Conductor referred back to her opening statement about me judging them as not using technology enough when discussing this with me. She was very keen to provide students with suitable computer technology including digital recording equipment and sequencing software such as Pro Tools or Logic, which would allow the students to record their songs. Once they had recorded their song, she believed they could then experiment with many of the sound effects included as part of the software.

Ms Singer appeared more comfortable using contemporary music in her junior classes. As she said, her performance music class struggled with Sibelius and she introduced them to Band in a Box for their composition work. Band in a Box does have a feature that will allow someone using it to input notes directly using a MIDI keyboard and will provide a level of traditional notation but it is not as sophisticated as Sibelius. Ms Singer did make the point that she was still requiring them to be able to write a melody and harmonise it with basic chords; thus, although she considered the software they were using was easier than Sibelius, the type of task the students needed to complete was very much the same. The opportunity for any real exploratory behaviour by the students with the software was therefore rather limited although

there remained some opportunity for students to demonstrate their creativity within the guidelines of the task.

The next issue I would like discuss in this case refers to teachers' use of technology as described by Beckstead (2001) and Hennessy, Ruthven and Brindley (2005). The literature discussing research into pedagogical change because of the implementation of ICT offers little support for the popular rhetoric about technology revolutionising teaching and learning or teachers fundamentally changing their pedagogical approaches and re-working their lesson plans (Hennessy, Ruthven & Brindley, 2005). Savage (2012) supports this view and suggests that unlike the technological developments in wider society, the developments within the world of formal classroom have not yet exploited the potential of these new technologies choosing instead to limit use to what they know and feel comfortable with and states that this disjunction has been noted by a number of commentators (e.g., Cain, 2004; OFSTED, 2009; Savage, 2004).

Recent research (Savage, 2007, 2010; Wise, 2010; Wise, Greenwood & Davis, 2011) reveals the following key points. Firstly, there remains an inherent conservatism in musical pedagogies when using digital technology. Many classroom teachers are simply using the technology to do what they have always done, although they may in fact claim that they have changed their practice (Cuban, 2001; Hennessy et al., 2005; Southcott & Crawford, 2011). In this case study, Mrs Conductor and Ms Singer both stated that despite the technology available to them, they have not changed their approaches to most activities and were still doing the same things in the classroom, as they were when they did not have it available to them. In fact, Ms Singer said that, apart from using Sibelius for teaching composition, her main use of

technology was the introduction of PowerPoint into the classroom to make her presentations a little more interesting for the students.

Secondly, Savage (2007) found that many music educators tend to prioritise the use of digital technology for older students and that this practice reinforces the inherent conservatism. Most senior students who choose to study music tend to come with a background in the Western classical tradition and are able to use the technology to write music in that particular genre. Music teachers appear to be able to judge success with digital technology when it reinforces a traditional approach to music education such as the production of a notated score (Savage, 2012). An important finding in the research carried out by Hennessy et al. (2005) was that for many teachers subject pedagogy is dictated by the nature of external examinations students are required to sit and as such the use of ICT (unless specifically mentioned in the examination requirements) must take second place to guiding students to examination success. In this case, while the students are exposed to Sibelius in this performance music class, the skills they are being taught are seen as a preparation for the composition tasks prescribed at NCEA Level 1. At School B, this is evident in the way the activities in the performance music classes are structured. Mrs Conductor was clear that the performance music classes in Year 9 and Year 10 needed to have plenty of practice with similar activities to those required for NCEA Level 1 in Year 11. Students are required to perform individually and in groups on a regular basis in the junior performance classes. Students are also introduced to composition tasks with an emphasis on correct notation and traditional chord progressions. Both teachers indicated in their questionnaire responses and in their interviews that knowledge of notation and harmony are very important if students are to achieve at a high level in

NCEA. Success by students in all subjects in external examinations is a high priority for all teachers at School B.

Kiesler (cited in Beckstead, 2001) refers to the use of technology as either 'amplicative' or 'transformative' (p. 47). The first term refers to technology in the classroom being used to do traditional tasks better or more efficiently. However, a transformative impact is one that 'shows a qualitative change in how people think, act and react' (p.47). The evidence from School B shows both music teachers are using the digital technology available to them in mostly an amplicative fashion. I have spent some time describing their relationship with technology and in this description, I have tried to convey regular use of digital technology in a range of activities. However, the approaches taken by the teachers and the activities surrounding the use of technology are very traditional and remains orientated towards the Western classical tradition. The teachers are using the technology to support these activities making things easier and more accessible for students without really exploring the transformational potential that the technology could offer the students. The students themselves are all having formal music tuition and they made only fleeting references to informal music practices such as learning to play an instrument from watching their friends or working out the chords of a song by listening to a recording. The students enjoyed the practical activities and appeared to like working on composition tasks. They all said they enjoyed working with Sibelius as it appeared to 'enhance the variety and appeal of classroom activities' (Hennessy et al., 2005 p.157). It could be argued that once again, the skills associated with the Western classical tradition were more highly valued even though some of the students were learning instruments usually associated with more contemporary styles.

A further example of this amplicative use of digital technology was the use by both teachers of an interactive website developed by the San Francisco Symphony (http://www.sfskids.org). This website allows students to explore a range of musical concepts, listen to a number of well-regarded classical pieces and compose simple melodies using Western music melodic ideas. Mrs Conductor and Ms Singer were particularly enthusiastic about this website and said that the students were very focused when exploring the activities available to them. Once again, the teachers outlined how useful such a website was in teaching traditional Western music concepts to students in a manner that was interactive and fun for the students. It would appear that again the teachers are using a digital resource to reinforce traditional concepts.

7.5 Key Issues Arising from this Case Study

This case study shows how two teachers working in an independent school are using digital technology to support performance and composition activities in junior performance music classes. It indicates that both teachers use digital technology on a regular basis in a manner that supports the Western classical tradition in music education activities that the students undertake. While a philosophy based on performance informs the choices that the teachers have made for activities in the junior classes, these choices remain, overall, informed by the Western classical tradition, as this is what both teachers are most skilled in teaching. The expectation of high achievement in all subjects at School B influences the choices the teachers make concerning the type of activities the students complete in class. The teachers are under pressure to continue to deliver high levels of achievement in the classroom and with co-curricula activities. Their focus is on excellence and in a school such as School B, excellent results in NCEA and in the external competitions and festivals that the

music groups participate in are very important. The work that the students undertake in these junior classes in composition provides them with the necessary skills to be able to complete the composition achievement standards required for NCEA. Due to the emphasis the school places on high academic achievement, this remains the most important focus for Mrs Conductor and Ms Singer in the work they do with their students. In effect, the students are being prepared for NCEA work when they begin composition activities in the performance classes in Year 9.

Mrs Conductor relies on communications technology to run an efficient and effective music department. She also uses other forms of digital technology to aid and assist her to teach performance skills. Ms Singer does something similar. Both teachers recognise that students expect to use such technology. However, it would appear that in most situations the use of digital technology in music at School B remains more *amplicative* (Beckstead, 2001), as it allows the teachers and students achieve traditional tasks more easily and more quickly. There appears to be limited evidence of any real pedagogical change from either teacher.

Mrs Conductor is aware that a number of students now attending School B have skills in contemporary music practices, often as a result of their own informal learning experiences. In some cases, these skills are identified in the IEP meetings they have with their form teachers. The students have expressed a desire to pursue their passion for contemporary music and these requests have been passed on to the music teachers. Mrs Conductor is very conscientious and has a real desire to try to meet the needs of all the students with an interest in music attending School B, not just the students with skills in the Western classical tradition. Mrs Conductor shows signs of acknowledging that there are other examples of digital technology available that the school does not yet possess. She recognises that students with more

experience of informal music learning could be attracted by more accessible sequencing technology where traditional notation skills are not necessary to write songs, as it might meet their needs more effectively.

Both teachers are working very hard to provide what they believe are appropriate musical activities that will meet the needs of all the relevant stakeholders at School B, the students, the parents and the senior management in the school. Their accounts of the way they work, and those of the teachers at School A, provide a useful insight into the practice of effective music teachers working in the demanding context of an independent school.

7.6 Summary

In this chapter, I described the use by and the perceptions of a range of digital technologies by the teachers and a small of group of students in the music classes in School B. I described in some detail the context in which the teachers and students work. I highlighted the high academic achievement expected by students at the school and the demands and tensions this can create for the teachers. I described the high level of cooperation that exists between the two music teachers and how their shared philosophy of music education is informing their choices of activities that are presented to the students in the classroom. I also described the use they make of a range of digital technologies to support their work.

I identified a range of issues related to this work and compared this to some of the findings from a range of commentators writing about the adoption of ICT in the classroom, the impact of external examinations on choices teachers make to the use of ICT and the effect that formal instrumental music tuition (FIMT) may have on choices students make when working on individual compositions.

In the following chapters, I examine the practice of teachers working in the context of two different co-educational state schools. Once again, I will discuss the impact a particular philosophy of music education may have on choices for activities in junior music classes and how the national curriculum in conjunction with the training, professional experience and personal beliefs of the teachers are also informing these choices.

Chapter 8: Case Study 3: School C

> I have seen it in other departments where they have gone technology crazy and they have just walked away pulling their hair out, and they have said 'all we have got is computers' all of the instruments are gone and all they have are computers. I wouldn't like to see that happen because I believe that music, as a whole is exactly that. We will always have technology, we will always be developing new technologies and bringing new technologies into the classroom but to a limit, for sure. (Mr Bass Guitarist)

The previous chapter explored a number of aspects regarding the use and perceptions of digital technology in junior music classes in the context of School B. It examined what influenced the choices that the teachers made when using this technology. In this chapter, I will discuss the context in which the two teachers work at School C. An important point of difference concerns the training, musical experience, teaching experience and background of the head of department, Mr Bass Guitarist. He is the first teacher with a background of contemporary music described thus far in this study. Chapter 3 discussed the challenges that traditional music education practices face from contemporary music. In this chapter, I examine the philosophy of music education that informs music education practice in this school and examine the extent to which Mr Bass Guitarist's experiences with contemporary music influence the choices he makes for activities in junior music classes.

8.1 Music at School C

Music has been an important part of the co-curricula offerings at School C since it was established as a Technical College in the early 1930s. At that time, the main performing ensemble was the school brass band. This was typical of schools in working-class suburbs in New Zealand in the 1930s. In many schools at that time, whole school singing took place in school assemblies and most schools would have had an auditioned choir, which would perform at important school events such as awards ceremonies. The tradition of a school brass band remained at School C for

much longer than at many other schools as a previous brass itinerant instrumental teacher was a noted brass band conductor in the city and he organised and conducted the school band. Over the last 30 years, the range of instruments offered for tuition via the itinerant teacher programme has increased. Tuition is now available in brass, woodwind, orchestral strings, guitars, drums, and in contemporary vocal styles. The impact of this in the school has been an increased level of participation by students wishing to learn a music instrument and subsequent increase in the number of performing groups, big and small, and in a variety of genres and styles. In recent years, School C has participated in a wide range of regional and national music festivals. With the increase in interest by students in learning woodwind instruments, the school has been able to form a concert band. This ensemble has performed with distinction in national and international festivals.

Mr Bass Guitarist, the current head of department, has a background in contemporary music and studied jazz at tertiary level. He has worked hard at developing the school jazz band. This band also performs at a high level in regional and national festivals and has received a number of gold and silver awards for their performances over the last few years. Mr Bass Guitarist uses many of the itinerant instrumental and vocal tutors to organise and conduct smaller ensembles. The itinerant woodwind tutor conducts the concert band, the vocal tutor organises and conducts the choir and the guitar tutor helps with the organisation of a number of rock bands. Mr Bass Guitarist performs regularly in a variety of ensembles, both rock and jazz, at corporate events across the city. Many of the itinerant teachers working at School C teaching contemporary instruments also perform regularly in a range of bands and venues throughout the city.

Mr Brass, the assistant music teacher, is a capable performer on a range of brass instruments having grown up playing with one of the local community brass bands before studying music as part of a general arts degree at university, along with Geography. Mr Brass has previously been head of department and during that time, he worked particularly hard to maintain the tradition of brass band playing in the school and as a result ended up touring with a regional high school band playing in Hong Kong and Japan. In more recent years, he has supported the concert band by playing euphonium in the ensemble. Mr Brass also played a range of parts in the band for the various musicals the school performed over a number of years, working to support the students who were involved in these particular ensembles. Mr Brass no longer plays in the community brass band saying that after nearly 40 years, it was time for younger players to move into his seat.

The classroom music programme at School C provides compulsory general music classes for all students at Year 9 as part of a range of arts subjects taken each semester. Music then becomes an optional subject from Year 10 through to Year 13. Music as an option at School C is a very popular choice and, as a result, School C is able to run two performance classes in Year 10. This is unusual among schools in the city, as most would only have one music option class at Year 10. These classes are run as performance music classes and cater for a range of instruments, classical and contemporary and a range of performance abilities. The classes are not streamed with more able students in one class and less able in the other. Nor are they dominated by one particular group of instrumentalist, either classical or contemporary. The classes remain as true mixed-ability groups.

The content and range of activities undertaken in the junior classes is guided by the New Zealand National Curriculum and, as prescribed, should include a range

of activities including using digital technology where appropriate. Mr Bass Guitarist and Mr Brass share all classes at the junior level and each teacher takes one of the Year 10 performance music classes. Music in the senior school is offered at NCEA Level 1, Level 2 and Level 3 and Scholarship. At School C, Mr Bass Guitarist said most students complete most of the Achievements Standards for Level 1, but at Level 2 and Level 3, depending on the number of credits they have and their particular musical strengths and particular interests, some opt to take some of the Music Technology Unit Standards. This is very different to the two previous schools at which there appeared to be a greater emphasis on the more academic approach, where students taking music would complete Achievement Standards only. Again, Mr Bass Guitarist and Mr Brass share the senior music classes with Mr Brass taking the Year 11 class and Mr Bass Guitarist the combined Year 12 and Year 13 classes.

Overall, School C has a well-organised and integrated music programme where, as was the case in School B, both teachers have a shared philosophy on the importance of practical music in the classroom. This common approach results in all of the general music classes at Year 9 performing pieces from a resource book that has been prepared by the two teachers. These pieces are arranged for keyboard, bass guitar and rhythm guitar. The melody is notated for students who read music but also has the note names written under each note. The keyboards have the note names written on the respective keys, which enable students without note-reading skills to play the melody. Mr Bass Guitarist usually plays bass guitar with the group and when Mr Brass is running a practical session, he plays piano with the class.

Although the teachers share a similar philosophy concerning the value of practical music making as developed by Elliott (1995, 2009), Mr Brass has a more traditional approach in his teaching. He has always stressed the importance of

traditional music notation and knowing music theory. During the time he has been working at School C, he has seen a number of changes to the music curriculum and the national examination system. For a number of years, music as a subject in the external examination system was very much a history of music course with associated traditional aural tests and theory questions. While Mr Brass was pleased that performance and composition were now part of the music curriculum in the national qualifications, he explained that he had more experience teaching music history, aural and theory, as it was required for the external examinations pre-NCEA. As a consequence, while being able to cope with the requirements of the NCEA Level 1 Music Achievement Standards, his focus tended to be more towards the Western classical tradition as he was less familiar with more contemporary styles.

Mr Bass Guitarist has been teaching for a much shorter time than Mr Brass has and had not been required to teach the old prescription with its strong emphasis on the history of music and related music works. He has a contemporary background, is a highly skilled performer and is very experienced when it comes to teaching performance skills, particularly in contemporary styles. Although he recognises the importance of a knowledge of traditional music notation and theory, he is equally comfortable working with jazz lead sheets, composition that included passages that were improvised and using technology to support students who may not have the skills to notate their compositions in a traditional manner.

When I was collecting data at School C, the two teachers completed the questionnaires separately, but requested that they be interviewed together in order to build on each other's answers. Mr Bass Guitarist said they were a music teaching team, each with their own strengths, but they covered the same material with what he

described as ‘similar’ approaches with the performance music classes they each taught.

8.2 School C

School C is located in the northwest of the city and is classified as a Decile 6 state co-educational school. Currently, the school has a growing roll of in excess of 1,500 students. It has recently instigated an enrolment scheme to limit the number of students attending the school. This has not always been the case, as numbers have fluctuated considerably over the years. In the 1990s, the school roll was half the size it is now. The school was founded as a technical college in 1936, but became a high school in 1949. The school has traditionally been viewed as a typical working-class school with the majority of students coming from middle to lower socio-economic families. Over the last 20 years, the makeup of surrounding suburbs and feeder schools to the school has changed with a higher proportion of higher socio-economic families moving into the area. As a result, the community has viewed the school as more desirable with a resulting increase in enrolments.

The school has a history of innovation and in the early 1990s was one of the six ‘lighthouse’ schools that were successful in bidding for a special financial grant to develop teaching and learning programmes utilising developing ICT offered by the Ministry of Education. This was very important to the school and the funding allowed the school to purchase a considerably greater array of digital technology and to develop innovative pedagogy using the equipment. In particular, this technology was made available to all faculties across the school, including in the arts. In music, this resulted in a new keyboard laboratory being purchased and an early MIDI capable computer system with notation and sequencing software available.

School C has always offered a wide range of co-curricula activities. The school has enjoyed considerable success nationally in touch and netball. The school regularly participates in a range of cultural activities including Stage Challenge, Rockquest, the Big Sing and Concert Band and Jazz Band Festivals. In the past five years, members of the jazz band have been selected for the Festival Band at the Southern Jam, the South Island Schools' Jazz Festival. Members of this band are considered the best players in their school bands and it is a reflection of ability to be selected.

One of the most popular public functions at School C is the annual music department soiree. This concert features a wide range of performing groups throughout the school. Individual performers have an opportunity to play for friends and family. All of the large performing groups also perform and the evening usually finishes with performances from the jazz and concert bands. While individual tuition is available for orchestral strings, numbers of students playing these instruments are small compared to woodwind, brass and contemporary instruments such as drums, electric and bass guitars. Vocal performance is also featured where again; many students are interested in contemporary vocal styles.

8.2.1 Mr Bass Guitarist and Mr Brass.

The music block at School C is located at the very front of the school next to the main entrance to the school and close to the old school assembly hall. The building is long and narrow with practice rooms located at one end and classrooms on the left hand side of the building. On the right hand side are located a specialist computer room, a large performing space set up for the jazz band and the music library and staff kitchen area. The two main teaching classrooms are separated by a

staff workroom. There is access to the largest room from the staff workroom. Attached to the second teaching space is a keyboard lab.

I met Mr Brass first as he was in his classroom and Mr Bass Guitarist, the head of department, was in a meeting with the principal of the school. Mr Brass is rather unique among the teaching staff at School C, as he was head of department for a number of years before resigning from that position to become an assistant teacher. His reasons for this change included less pressure with administration, more time working with the students and what he described as a better work and life balance. Mr Brass had taught at School C for over 30 years and had enjoyed a very positive relationship with both staff and students in the school. He knew many of the families in the area very well having taught parents of some of the students now attending the school. He greeted students who were passing his room warmly, at times providing a gruff reminder to those that needed to complete some piece of work for him. It was evident that the students had a great deal of respect for him in the way they greeted him and responded to his requests. I had an excellent relationship with Mr Brass, as I became head of department when he moved to becoming an assistant teacher. We worked together for nine years during which time significant changes occurred both within the school and in the national music curriculum.

While waiting for Mr Bass Guitarist to return to the department, we discussed the project and the data I hoped to collect from School C. When discussing the initial teacher questionnaire, Mr Brass described himself as ‘an old man now’ and said that he would ‘probably fall off the bottom of the scale of technology use’. However, he then continued saying that despite this, he was starting to come to grips with some of the new technology and was using it more and more. I was intrigued by this comment as, at the front of his room, was a computer workstation incorporating a computer,

sound mixer, stereo, external hard drive and connections to a data projector that he said he was using regularly. It was almost a contradictory statement when so much digital technology was located right at the front of his room. I commented on this and he replied saying if he became stuck, he would often ask a student to help him with some of the more technical things. He said he was comfortable doing this, as the students always seemed to know what to do if he was struggling with some piece of equipment or software.

At this point, Mr Bass Guitarist returned from his meeting and greeted me warmly. Mr Bass Guitarist is much younger than Mr Brass is. Like Mr Brass, he too enjoyed a positive relationship with the students that were passing the room. One senior student came in to the room we were in and asked to use a guitar. Mr Bass Guitarist introduced me to the student and explained who I was, why I was there and what I hoped to do with the research project. The student listened politely and said that he thought School C would be a great school for the research because there was 'heaps of technology here and we use it all the time!'

Mr Bass Guitarist apologised for the clash of meeting times but said he was negotiating with the principal as to which spaces he and Mr Brass could use while the music department was being renovated. I asked him about the plans they had for the department and he became very excited about what they had planned and then left briefly to retrieve the architectural drawings. On his return, he showed how a couple of the rooms were going to be modified to make them more useful spaces in that they could accommodate more computers, more keyboards with better access between the rooms and to the new teacher workroom. The dark main corridor was going to have internal windows built in to allow more natural light into the teaching spaces. Mr Bass Guitarist appeared most excited about the re-wiring of the department, which, he said,

would allow considerably more networking capabilities. One of the main developments was a substantial upgrade to the current computer room with more machines, greater internet access and a much faster network connection.

The discussion then returned to my project and Mr Bass Guitarist said that he was very interested in my project and said that he viewed School C's participation as a valuable professional development exercise. He said that he looked forward to working with me and was keen for me to share any findings with him. He said he hoped that I could provide him with a 'mirror' for the department to help him identify things they were doing really well, particularly where he and Mr Brass had prepared activities using digital technology and where things might be improved, particularly in their use of technology to support activities in performance and composition.

8.2.3 Students at School C.

I asked Mr Bass Guitarist to select six students to participate in the group interview. I asked him to choose students that played contemporary and classical instruments and asked, if possible, for a mixture of boys and girls. The students he selected for me came from the Year 10 performance music class. Two of the students, both girls, learnt flute at school and classified themselves as classical players. Two of the boys were guitarists with one quick to identify himself as being the 'heavy metaller' in the class. The third male student played bass guitar and in response to the student who identified himself as the heavy metal fan said that he enjoyed all styles of music. The final female student said she played a range of instruments and sang regularly but preferred playing drums whenever possible.

The students in the group proved to be an interesting cross-section of the ethnicities of students attending School C. One of the male guitarists had parents who were from Russia and the other male guitarist had a father from Italy. One of the

female flautists said her father was Lebanese. The other students described themselves as New Zealand European. School C has a school uniform but, as with many state schools, it was less formal than the two independent schools described in the first two cases. Although all the students appeared reasonably well groomed, the boy who described himself as the 'heavy metaller' had considerably longer hair than would be tolerated by School A. It was apparent that this was part of his 'badge of identity', as described by Lamont (2002). The two female students who played the flute both wore correct school uniform and looked very neat and tidy with their hair tied back from their faces, much in keeping with the students attending School B. The other female student, the singer and drummer, wore shoes and jewellery that were not part of the school uniform. It may be possible to speculate that this student also dressed in a manner that represented her allegiance to a particular musical peer group. This student initially appeared a little reluctant to participate in the group interview but once we had discussed what I was going to be doing and why I was doing it, she became more relaxed. As the interview progressed, she appeared very interested in what we were discussing and was happy to contribute and answer questions or build on ideas that the other students provided. Although it was evident that students in the group came from different peer groups in the school, they all respected each other when in music and seemed to enjoy each other's company while participating in the interview.

8.3 Performance in the Classroom

Playing music in the classroom is a very important part of the Year 10 performance music classes at School C. This praxial approach to music reflects the shared philosophy of the two teachers working at School C. Mr Bass Guitarist and Mr Brass shared the view that the Year 10 classes were very important in preparing the students for success in the Achievement Standards at NCEA Level 1, particularly for

the individual and group performance achievement standards. This approach is very similar to what occurs in School B; however, at School C the way performance skills are taught is very different. At School C, the emphasis in Year 10 is on group performance. Although students have the opportunity to play by themselves in front of their peers, it occurs less often than at School B. Many of the students in the Year 10 class at School C have received very little, if any, formal instrumental tuition. This is one of the reasons why individual performance occurred less often. I discussed this point with Mr Bass Guitarist and he acknowledged that some of the more capable performers found this a little frustrating but that he, and Mr Brass, worked hard to arrange music that allowed the more competent performers to play more complex parts, often demonstrating considerable virtuosity. He said that if they were playing a rock piece that where there was the possibility for an improvised solo, the student guitarist who was a fan of heavy metal often played a very impressive solo part. Mr Brass said that while he thought giving students experience in individual performance was good, he too said the logistics of organising this with large numbers was difficult.

The six students were very enthusiastic about the practical activities and identified them as their favourite thing in music classes:

> Practicals and learning about different styles of music. (Student 1)
>
> Just practicals, not too much theory. (Student 2)
>
> Practicals—doing the different types of music like blues or classical. (Student 3)
>
> I really enjoy the practicals and playing different types of music as well. (Student 4)

> I like doing the practicals and when you learn about the history of types of music. (Student 5)

> Practicals and history as well. (Student 6)

When I asked them why they enjoyed the practical sessions, they provided the following answers:

> Pretty much because I can play the guitar. I am the only one who plays the guitar and it gives me practice since I am in a band. (Student 1)

> I just like playing with everyone so it all sounds so complete. Because it sounds different when you're at home and stuff. (Student 2)

> I enjoy practicals because I don't actually have a drum kit at home, so it is just practising on walls or whatever, but not really drums. (Student 4)

> I like it because we play in a group and you really feel part of it, like fitting in. (Student 6)

The music programme at School C places considerable emphasis on practical activities but the teachers saw these activities as only part of what they offered in the music course at Year 10. Mr Brass described performance as being very important saying that 'you have to have your hands on, with keyboards, guitars and whatever', but other activities must be included such as learning music theory and writing compositions. Mr Bass Guitarist agreed with this and added that he viewed the practical activities being the starting point for many of the other activities in the classroom, including learning music theory and developing skills in composition. The students have an opportunity to play a piece first, hear what it sounds like and then explore any new melodic ideas, structuring devices, chord progression or interesting rhythm patterns that are contained in the piece. Once identified, these ideas or

concepts might be developed by the students their own composition or expanded upon via a more traditional theory exercise. The two teachers spoke of the enthusiasm the students had for practical classes and how much they seemed to enjoy playing music together, on a variety of traditional classical and contemporary instruments in a wide range of styles and genres.

8.3.1 Technology in the classroom.

School C has a very high level of technology visible in both classrooms. Mr Bass Guitarist's room has an extensive computer workstation visible at the front of the room. This comprised a computer and monitor, an external hard drive, an audio mixer, a drum machine and receivers for wireless microphones. The audio mixer was connected to a power amplifier that drove four large PA speakers located in the corners of the room. Above the piano and suspended from the ceiling was another computer monitor screen. Mr Bass Guitarist described this equipment as 'the tools of the trade'. When asked how he used the equipment in teaching situations, he replied that he used the computer for all pieces of recorded music relevant for his teaching with playlists on iTunes prepared for each year level. The students could get the workbooks with melodies and chords for the songs they would play in practicals and have them in front of them but he said he often would use the data projector to project the sheets on the large screen at the front of the class. He said he usually ran practicals from the piano and would use the monitor suspended from the ceiling to see the songs without having to have printed music in front of him. He said he did the same when he played bass guitar with the class, as this was his preferred instrument.

Mr Brass had a similar range of equipment in his workstation in his room. However, he still had a traditional stereo system connected and said that unlike Mr Bass Guitarist, he preferred to use CDs when playing musical excerpts and examples.

Mr Brass said that he and Mr Bass Guitarist often swapped rooms depending on what particular unit they were working on at the time. Mr Bass Guitarist had 16 keyboards located along one side of the room while Mr Brass had 10 digital pianos located in a small room at the back of his teaching room. This could be opened up or closed off via a sliding flexible door if required. Mr Brass explained that he would use the digital pianos for some activities and the keyboards in the other room for others. When questioned further about this, he said he felt the digital pianos were more useful for individual composition work and individual performance whereas he felt the keyboards were more suitable for group performance.

When asked if the technology they had available had changed their pedagogical approaches, I received two different answers. Mr Brass replied first and said that he was quite sure that the technology had changed his approach in that he no longer felt he was the 'dominating feature' of the classroom. Mr Brass was the most experienced teacher in this research project and as a result of that experience had witnessed much change, both in curriculum and in approaches to teaching and learning. One might speculate that a more teacher-directed teaching style was more suited to previous music curriculum requirements that placed considerable emphasis on examining the historical importance and stylistic diversity of 10 individual works by different composers.

He described feeling much more comfortable allowing students to work on their own or in groups and related that they worked better as a result of the technology they had available. He said he felt their level of focus was much better. He continued to describe how he used the data projector in more formal teaching sessions, and that his presentation of important material via the computer had, he felt, improved his teaching. Such comments were similar to those of Mr Violinist at School A, a teacher

with a similar number of years' experience teaching music in a secondary school and with a similar background albeit one with classical orchestral experience compared to one with a strong grounding in brass band music.

Mr Bass Guitarist replied with the following:

> I've never taught without technology. I have never had the opportunity to stand in a classroom with only a whiteboard pen, so do you think that technology is changing the way you are teaching because of technology, no, not at all, because I have always used it.

Mr Bass Guitarist is one of the younger heads of department at School C. His tertiary qualification is in jazz performance. He said he spent a great deal of time using digital technology in his own music studies and in performance. He described being required to use Sibelius when preparing small combo and large band arrangements, and that experience has proved particularly useful when teaching composition in classes at both his previous schools and now at School C. He said that because of his performing experience working as a gigging musician on a regular basis, he has a good understanding of the much of the technology used in the music industry and that this too has proved useful when teaching at high school level. This, he explained, is why there is so much digital technology visible at School C and he said he intended to continue to think of ways to introduce more technology into the classroom as he felt it could improve his teaching and improve the students' learning. Mr Bass Guitarist ensured that all the instruments were in excellent condition, the guitars were always tuned and that guitar amplifiers, leads and other related equipment always worked. This ongoing maintenance of equipment also extended to the keyboards and computers that the students used for composition. Mr Bass Guitarist said he believed in providing the best equipment that the school could afford

for the students to use so the students had every opportunity to enjoy success when using it. He believed students respected the equipment and having excellent resources available was a major contributor to improved performance skills, particularly in contemporary music.

8.3.3 Composition in the classroom.

Students at School C are first introduced to Sibelius in Year 10. When questioned about this decision, Mr Bass Guitarist said that he felt there was not enough time to do this with the Year 9 classes. The emphasis in Year 9 was placed on performance and getting the students enthused so they would want to take music as one of their option subjects in Year 10. Mr Brass added that this approach seemed to working as the school had run two Year 10 option classes for a number of years.

In a similar fashion as Mr Violinist at School A and Mrs Conductor at School B, Mr Bass Guitarist has developed a Sibelius tutorial, which all students are required to complete in order to gain an understanding of how the software operates and how notes can be entered onto the staves on the screen. However, reflecting his background in contemporary music, the fonts used are very different to the traditional music scores produced at the other schools and the style is very different too. The scores the students produce are much more like a jazz musician's lead sheet. Following the initial tutorial where basic skills related to note entry are taught, Mr Bass Guitarist has developed a composition task where students are required to complete parts in a 12 bar blues progression. As part of this tutorial, Mr Bass Guitarist has prepared one section that is an exemplar that the students are unable to modify. This exemplar has a second section containing little melodic riffs and phrases that the students can use in a composition of their own where the accompanying parts are provided but where the students need to create their own lead parts. Following

completion of that task, the students are then required to write their own blues piece. The students have had the opportunity to play a number of 12 bar blues pieces in their performance classes and this task is designed as a follow-up to that work. As Mr Brass explained, ‘it is a case of right, you have had a play in class and with the demo piece—there is a blank sheet of paper, select what you want and go for it!’ As a result, the students are able to complete an effective piece in a contemporary style that sounds effective relatively quickly and easily.

Mr Bass Guitarist and Mr Brass spend some time discussing their use of Sibelius as the main tool for teaching composition. Mr Bass Guitarist was emphatic when he said that students responded well to tasks using Sibelius as it appealed to them ‘way more than the old chalk and talk’. He said that in his Year 10 performance class students, with some musical understanding and an understanding of computers, ‘really grab it, they go really well with Sibelius’. Mr Brass added that he had noticed that as a result of Sibelius becoming a necessary tool for composition, an unexpected benefit for him is that it seemed to be helping students to read music. He said he felt activities using Sibelius seemed to have a positive effect on their reading of bass and treble clefs. He added to this suggesting that when you combined this with having to read music in practicals, their overall understanding of music theory was also improved. This was important to him, as he was insistent that all musicians needed to be able to read music and understand music theory.

Mr Bass Guitarist added to this discussion with the following comment:

> I think Sibelius is definitely a tool and everyone needs to learn how to use tools. There is no point in putting a carpenter on the site without knowing how to use a skill saw, they would chop their hands off! The Sibelius tutorials are

> really important, really important to do and complete and then move on to the blues composition.

He acknowledged that students could work on compositions using pen and manuscript paper and he often encouraged some students who struggled with Sibelius to work in that manner. However, he was insistent that senior students who were working on the composition achievement standards had to know how to use Sibelius in order to achieve well at that level. His views echoed those of the teachers at School A and School B in this regard.

Mr Brass added to this point by saying how useful the recording and playback function was when students had to have a recorded example of their composition as part of their composition portfolio at NCEA Level 1. He said that he had taught students at this level for a number of years pre-Sibelius and the time and effort required to record performances of compositions was huge and required considerable organisation to find skilled performers available to play them. In most cases, he said he was reliant on the itinerant teachers or other senior students to play the compositions while he recorded them, initially on a reel-to-reel tape machine, then on cassette and finally digitally.

One area of difference between Mr Bass Guitarist and Mr Brass was their perceptions of the usefulness of sequencing software that had pre-recorded loops available for users, such as GarageBand. Mr Brass said that using loops when creating a piece was ‘just cutting and pasting and that is not composing!’ He agreed that it might be useful for students who really struggled with Sibelius because of their lack of understanding of traditional notation. His comment was this:

> I suppose that if they get fun out of it and they come up with something that they have enjoyed creating, then I suppose it is ok, but it will be a low priority

for me if and when we use it. It is not original you see, that is what annoys me. For me, to compose, there has to be aspect of originality in it.

Such a view of pre-recorded loops as not being original is consistent with similar views held by other music teachers as described by Vakeva (2010). Just what constitutes originality in any form of creative activity has become increasingly contestable. Vakeva argues that digital technology can enable manipulation of previously recorded sounds by someone other than the original composer and in many cases, this has become a form of creativity in its own right. Such an approach to creativity appears common in many recent examples of contemporary music, particularly where fragments of existing songs have been sampled, re-arranged and included in a new piece, often in a very different style than the original.

While Mr Bass Guitarist agreed with some of what Mr Brass described, he pointed out that such technology is now used widely in the music recording industry as described above and he believed students should have the opportunity to work with software they may have access to in the outside world. However, he qualified this by saying most of the students they have taking music at NCEA Level 1 can read and write music effectively using Sibelius so that is where the teachers focus their efforts on at present. Their final comments as regards the use of Sibelius and digital technology reinforced the fact that while it was important for students to know how to use such technology, they both believed that it was only one component of a music course.

The two music teachers working at School C, with quite different musical backgrounds, reiterated the importance of students understanding music theory and being able to read and write music using traditional notation. The teachers emphasised the importance of practical music making and said that getting students playing music

was, in their opinion, the key to a successful music programme. While digital technology was very beneficial to a range of musical activities, they felt it was only one part of what music at a secondary school should be.

8.3.4 Students' use of digital technology.

The students interviewed at School C provided a number of comments about their use of computers in musical activities at school and at home. Each of the students referred to listening to music on iTunes on their home computers. The two guitarists made specific references to listening to music on iTunes and often, after listening to a song they really liked, searching for guitar tablature of the song and using the tablature to help them learn the song at home. The student who liked heavy metal explained how this was the way he learnt a number of solos played by guitarists he admired. The student who played bass guitar said that he often searched for music with traditional music notation written in the bass clef so he could practise his note-reading and performance skills.

All of students showed some awareness of GarageBand. Student 3 said that he had used GarageBand at his previous school. He said he and a group of friends had worked on a song in their lunchtime and he really enjoyed using it. Student 6 said she often used computers in music classes at her previous school and that she and other members of that class regularly wrote compositions using GarageBand. She said that it was something she really enjoyed. Student 2 said he really liked using GarageBand because you had the opportunity to 'record your own beats and then repeat them over and over'. He explained that he would often play along with these 'beats' he had created in order to improve his performance skills on the guitar.

Student 4 described using GarageBand away from school:

> I use my computer for listening to music or downloading it. Also, when I am at my grandparents, they have GarageBand where you can make your own music so, I usually do that. Instead of the drums on that, because I don't really like the sound of the drums on that, I just play my own drums to the songs I have made.

Student 4 then discussed using social networking software to share songs she had written using GarageBand. She said she knew how to save the songs into iTunes and how she then shared them with her friends:

> I have quite a few friends who also play the guitar and stuff so, sometimes I will write lyrics for a song and sometimes we will get together and put the music part together for it. My cousin, he is really good at the guitar as well and he writes his own songs as well, so we share them back and forth and help each other out. It is really cool.

Student 5, one of the classical flautists, said that she had composition software available to her on her home computer but she said she did not understand how to use it and 'preferred to write music by hand'.

At the time the interview took place, the Year 10 performance class the students came from were only just starting the first of the Sibelius tutorials. They said that they had spent only one session using the computers working through the exercises included in the first tutorial. They did discuss the way Mr Bass Guitarist had used some software called MusicAce to teach music theory. They said it was fun for a while but since all of them had learnt to read music at previous schools, such software became a bit boring after a while. Student 1 said he sometimes became quite frustrated when he was required to complete tasks he was sure he had already completed the year before, such as identifying notes in a melody, rhythm patterns or

the chords used in a 12 bar blues progression. Student 4 said she understood that there were some students in the class that still were uncertain about reading music and that they needed extra help. However, she too wished students who could complete the note-reading tasks quickly could have had something else to do.

The final part of the interview involved the students sharing their thoughts about the level of digital technology being used in contemporary music that was current. The students provided a range of responses. Student 3 started the discussion by saying he liked the way many songs used pre-recorded loops and samples and he would like to be able to do something similar when writing songs at school. Student 1 said he thought that loops and samples 'lacked originality', and songs should be written using real instruments. Student 2 followed suggesting that for him the technology made things easier and he found having the ability to play around with loops quite creative. Again, he referred to using software like GarageBand to create his own rhythm patterns and using them to support his guitar performance skills. Student 5 suggested using a combination of computer-based loops and real instruments would be best. She felt that it was important to try new things and digital technology allowed you to 'play around with sounds'. Unless you did this, she suggested, you do not really know what is possible, so you need to 'just try new things and decide what is best for you'.

8.4 Emerging Issues

In seeking to present some preliminary findings from this case, I will identify three issues that emerged from my detailed investigation of what occurs in music classes at this particular school.

The first issue concerns the importance practical music making has in the junior music classes at School C. The two teachers discussed how important they felt

this was in a successful music programme. The music department at School C is very well equipped with a large number of electronic keyboards, digital pianos, acoustic, electric and bass guitars with amps, and two drum kits permanently set up and available for students to play. These instruments are kept in excellent condition, the guitars are tuned regularly and all amplifiers and ancillary equipment is very well maintained. While some un-tuned percussion instruments were available, such as tambourines and claves, all xylophones and glockenspiels had been removed from the classrooms. I asked Mr Bass Guitarist about this and he said that he believed students were much more interested in playing 'modern' instruments and he never used them. Mr Brass echoed his comments and said that even though he was more of a 'traditionalist' and that he used such instruments extensively over a number of years, he believed students had become more interested in playing keyboards and guitars as opposed to xylophones or glockenspiels. He said that he thought students perceived such instruments as 'babyish' and were only used in primary schools. It may be argued that such a change once again represents another form of cultural capital and that modern instruments such as the ones described above provide greater cultural capital for the students and the music department at this school, as the students perceive they are playing instruments associated with the styles of music they most enjoy.

The second issue concerns musical identity in young people. A number of commentators have written about student identities in music (e.g., Hargreaves & Marshall, 2003; Hargreaves & North, 1999; Lamont, 2002; Lamont, Hargreaves, Marshall & Tarrant, 2003). Wright (2008) discusses the importance of a musical identity and the twofold nature of students' relationship with music. Students, she argues, may identify with a particular social sub-culture in music such as pop, rap,

R&B and the like, but they also may develop a distinct musical personal identity as well (Wright, 2008). Comments from the students interviewed at School C appear to support this with one student saying he was the class's 'heavy metaller' and another describing herself as a drummer. Such identities are very important to the students. According to Hargreaves and Marshall (2003) students 'actively construct their own musical identities, and these can determine skill, confidence and achievement' (p. 256). Both Hargreaves and Marshall (2003) and Wright (2008) discuss the possible disjuncture between the musical identities of teachers and students. They discuss how many students' musical identities are strongly bound up with the cultural associations of contemporary music out of school; yet, their music teachers are often the products of the Western art music tradition, which still dominates a good deal of music in secondary schools. These writers also point out that music in a secondary school tends to involve the teacher's control of the curriculum and as a result the activities undertaken in the classroom. In many cases, this will include the choice of music in the performance situations. Mr Bass Guitarist and Mr Brass choose the music students perform in groups in class at School C. While the students I interviewed at School C told me that they enjoyed playing music in class, two of the boys who played guitar said that they wished they had a little more choice in pieces they were performing. Two of the students said they quite liked playing some of what they described as 'older' pieces because they had heard them at home when their parents were listening to music.

The third issue I wish to identify following this examination of music at School C is connected with the formal versus an informal pedagogical debate, which has become a substantial part of the discourse in current music education research. In a recent paper, Finney and Philpott (2010) discuss how Informal Learning Pedagogy

(ILP) has become a significant theme, particularly in English music education. This pedagogical approach characterises music teaching as facilitation over instruction and co-construction of the curriculum by students and teachers over 'delivery' (Finney & Philpott, 2010, p. 7). This approach has grown out of the ongoing debate, also discussed by Espeland (2010), concerning how music curricula might be developed to alleviate a perceived growing alienation by adolescents to a curriculum that, despite increasing the breadth of musical styles to include, pop, rock, jazz and world music, still maintains an adherence to traditional music notation, a particular canon of *good* musical works and a set of associated performance practices (Finney & Philpott, 2010).

An ILP approach to music education, as championed by Green (2001, 2006, 2008), and the recent large-scale Paul Hamlyn Foundation research project, Musical Futures, is characterised by the processes adopted by many contemporary musicians in their music learning and music making. Some of the features include learners choosing their own music that they learn themselves, and it is learnt by listening and copying, rather than by traditional notation. Learning often takes part in groups with skills and knowledge acquired on an 'as needed' basis. The musical areas of performing, composing, improvising and listening become integrated with an emphasis on creativity (Wright, 2008). Green (2006) and Westerlund (2006) argue that this pedagogical approach can be shown to motivate students towards valuable learning experiences in a wide range of styles and genres in music.

Three of the students interviewed at School C provided glimpses of their experiences with a more informal style of music learning. Student 1 (guitar) described using his computer to listen to songs he liked and sometimes he would copy the guitar part and play along. When questioned about how much learning he did like this, he

replied that if the band he played in wanted to learn a new song, he would spend considerable time listening to it on iTunes and playing along until he had it right.

Student 2 (guitarist) also described doing something similar although he confessed that if he could not work out a guitar part just by listening, he would sometimes download the guitar tablature to speed the process up. Student 4 (drummer) described using software at her grandparents place to write songs, convert them to a format suitable for iTunes and then share them with her friends to add other parts and to aid with the creative process.

Wright (2008) and Finney and Philpott (2010) refer to the concept of *habitus*. Finney and Philpott describe habitus as the process of socialisation, leading to unconscious habituated ways of thinking and acting socially. They argue that music graduates arrive for initial teacher education having acquired a habitus where an awareness or an experience of informal learning practices may lie 'buried' because of the privileging of the formal over the informal in their prior music education. In this case, Mr Bass Guitarist explained that he grew up listening to music and learning to play by copying what he heard. He found that his skills as a bass guitarist developed to such an extent that he started to consider studying contemporary music and ended up graduating with a degree in jazz performance. While his initial teacher education course included instruction on how to use contemporary music and jazz in the classroom, he explained that notation and understanding music theory were an essential part of the course content because of the requirements of the external examination system. In other words, he may have acquired a habitus where, despite his early use of informal learning processes, formal instruction was privileged both in his tertiary music qualification, and in his initial teacher education, which was reinforced by the requirements of the curriculum and external examinations.

School C is the first school I have described where the head of department does not have a traditional Western art music tertiary qualification. While he has introduced a very high level of technology into the school and was aware of the developments in current contemporary music recording techniques, he still believed knowledge of traditional music notation and theory was essential for students to achieve well in music. Mr Brass has a general arts qualification with papers in the history of music as his major in his degree. He came from a brass band background and has strong views about the importance of traditional theory knowledge. He was very emphatic that students who created compositions using pre-recorded loops had not created an original work because as far as he was concerned they were using someone else's loops. This opinion is consistent with someone who has received a traditional music education informed by Western music practices. Originality here is defined by creating something new, usually on a real instrument as opposed to combining or modifying pre-recorded loops or samples in a digital environment.

As a result, I found the music programme at School C something of a paradox. Music is flourishing at School C. The numbers in the Year 10 and Year 11 classes are much higher than in schools of similar size throughout the city. As I have described, a high level of technology and digital technology was evident. Students had access to instruments associated with contemporary music to play in the classroom. Tuition was offered in both classical and contemporary instruments. The co-curricula performance ensembles included concert, jazz and numerous rock bands. Numerical data from the student questionnaires and data from the interview indicate the students really enjoy music and especially the practical activities offered in their classes. They enjoyed working with digital technology and appeared to enjoy working through the very

structured tutorials in order to learn how to use Sibelius. However, like students in the other schools, they did not enjoy learning traditional music theory.

To an outsider, it may appear that the music teaching at School C would embrace ILP. However, based on the descriptive numerical data from the school and qualitative data described in this case study, it would appear that a more formal pedagogy remains in place. As in the two previous case studies, the demands of the external examination system appear to drive the content and pedagogical choices of both teachers. Mr Bass Guitarist has a contemporary music background and initially learnt music using an informal approach. However, his tertiary qualification still places considerable emphasis on music notation and music theory albeit in the jazz idiom. He understands informal music learning practices but his current habitus is shaped by his experience in his tertiary studies and possibly more importantly what is required by the students to achieve well in the achievement standards in NCEA. Mr Brass has always worked with a formal pedagogical approach and while he acknowledges digital technology has changed some of his pedagogical approaches in the classroom, he remains very clear that notation and music theory are essential skills for all students regardless of background or interest.

8.5 Summary

This case study shows how two music teachers working in large state school are using a wide range of digital technology to support performance and composition activities in junior performance music classes. Both teachers share a similar philosophy, even though Mr Bass Guitarist has a contemporary music background and Mr Brass a traditional Western art music education. These teachers believe that regular performance opportunities in the junior classes are an essential part of successful and effective music courses. Both teachers acknowledge that students are

coming to them with a greater understanding of technology than in the past and are using digital technology in such a way to try to engage the students in activities that the students see as less interesting, such as learning notation and music theory. Mr Bass Guitarist has introduced a considerable amount of technology into the music department at School C. He has invested heavily in instruments for the classrooms that he believes are more attractive to the students in the form of keyboards and guitars. The students use these instruments on a regular basis and appear to enjoy the emphasis placed on practical music. The students are taught composition via Sibelius. They follow a very structured tutorial before starting to write their own music. These teachers share the same beliefs about the importance of traditional music notation and music theory. They both believe that students need to have skills in these areas because they are required if the students are going to achieve at the highest level in the relevant achievement standards in NCEA.

In the next chapter, I will examine the practices of three teachers in the context of another state co-educational school. I will explore how a particular philosophy of music education is informing choices of activities in the general music classes at this school. Once again the training, professional experience and teacher beliefs and values are discussed.

Chapter 9: Case Study 4: School D

> I think that, for the kids in this school, if you were to say 'right, this is crochet and this is quaver and you will do!' They would go 'f#@k off'. It is as simple as that. But with this, it is like 'hey, woo you have got a great little idea there' yeah, 'let's find a beat, let's find this, let's find that' suddenly two months later, this kid is writing his own raps and all that kind of stuff. (Mr Drummer, School D)

This chapter explores the range of activities prepared by the music teachers in junior classes in the special context that is School D. An important part of this exploration is an examination of the use of digital technology in the general music classes in the school. In this school, all of the teachers have a tertiary music qualification in contemporary music studies. Their philosophy of music education, training, professional experience and beliefs contribute to their perceptions of the use of digital technology in the music programmes at School D. The school is classified as a state co-educational school and has a developed a range of innovative approaches when working with students that are disengaged learners. Here, the term 'disengaged' refers to students for whom traditional schooling appears unsuitable and students either leave school as soon as possible or display a range of challenging behaviours that create considerable tension and stress in the classroom. This chapter begins with a detailed description of the context in which the three music teacher participants are working.

9.1 Introducing School D

School D is located in the eastern suburbs of the city and is classified as a Decile 2 state co-educational school reflecting the lower socio-economic population located in this part of the city. The school opened on 2 February 1960 and over the next 30 years, the school roll grew in a similar fashion to other secondary schools located in working-class suburbs throughout the country that were built at the same time. However, numbers attending the school began to decline from the late 1980s

onwards. Many parents perceived the school to be less attractive than other schools located in wealthier areas of the eastern suburbs and as there were no school zones established, many parents sent their children to other secondary schools located closer to the city.

In the 1990s, changes occurred. A new principal appointed in 1989 arrived at the same time that a self-governing model of school management was implemented across all primary and secondary schools in New Zealand. This major educational reform removed the local education boards that were responsible for many of the policies and procedures that drove school administration at the time. Schools were required to establish a board of trustees comprised of local parents, a student and staff representative and the school principal. This board was then responsible for the governance of the school. A number of national guidelines remained in place but a school had the ability to establish their own priorities in a number of areas. This could include priorities for new buildings and they could place more emphasis on particular parts of the national curriculum if necessary. At the core of the self-governing model, a school had the opportunity to work with the local community via a process of consultation and establish what they community wanted from a school and how a school may be best equipped to meet the needs of the students that were going to attend. This exploration heralded the beginning of a period of real innovation at School D as a series of new possibilities were explored.

The first innovation was the establishment of a school crèche so that adults had a chance to attend the school as part of the school's community programme. The second was the response to the cry from the community for assistance in revitalising Maori education and the preservation of *Te Reo Maori*—the Maori language. A Maori member of staff in conjunction with the local community led the drive to develop the

whanau (which means family, and this context refers to a group of Maori students) class at the school. From this initiative arose the need for more trained Maori teachers and the school became part of a joint venture with the College of Education to do some on-site training. One of the trainees from this programme realised the need to re-engage with Maori and Pasifika students who either leaving school without any qualifications or were causing major management challenges in the school. This person looked at finding out what their strengths and interests were and considered how these might be combined with traditional school subjects in order to keep them in education. Out of this investigation grew the Academy programme that has been recognised nationally and internationally as an innovation of real significance. The Academy programme was a special project that combined academic work with vocational training and was designed to keep students engaged with the school.

Initially, this began with 35 students and a rugby league team. The students were treated as if they were elite sportspeople and directed to follow specific training programmes. Coaching and support was provided for both their physical and academic needs. The academy programme combined the sporting activities with academic work with the students spending half the day working on their sporting skills and half a day on traditional school subjects with specific emphasis on literacy and numeracy skills. The intention of the Academy programme was that when the students finally left the school, they would have some basic school qualification that they may have not achieved in the mainstream school system. Previously, many of these students disengaged from learning early on in their time at secondary school and left without any formal school leaver qualification. School D has a high proportion of the school roll identifying themselves as of Maori or Pasifika ethnicity. In 2010, 44% of the school roll identified themselves as either Maori or Pasifika (ERO, 2010).

The success of this first sports academy was soon very apparent and by 2000, other academies supporting childcare, electronics, theatre, trades, photography and music had been developed, often in conjunction with local tertiary providers. As a result, the school roll grew substantially and students that had been disengaged from learning were attracted from other parts of the city to the school in response to the opportunities the academies could provide for them. In the following 10 years, numbers at School D once again grew to over 1,000 students.

However, since 2000, the school roll has declined again. A new principal embarked on an ambitious re-building programme with the construction of new staffroom and administration block quickly followed by a combined music and performing arts suite attached to the redeveloped assembly hall. This building programme left the school badly exposed financially as the Board of Trustees had borrowed heavily against the deferred maintenance budget provided by the Ministry of Education. As a result of the declining school roll, the school faced a series of Curriculum and Pastoral Needs Assessments (CAPNAs). In a CAPNA, the principal works in conjunction with the staffing committee of the Board of Trustees to identify subjects where numbers have declined to identify excess staffing. The result of any CAPNA is a re-balancing of the number of staff compared to the number of students. As a consequence of these processes, a number of teaching positions were disestablished and ongoing maintenance of existing buildings was put on hold.

By the late 1990s, the facilities for music at School D had become out-dated and in need of some major refurbishment. Facilities and resources had become very run down with the result that very few students opted to take music at senior level. The appointment of a principal with a performing arts background in 2002 contributed to the re-vitalisation of both the facilities and greater numbers opting for music in the

school. He appointed an experienced head of department with experience with traditional and contemporary music skills. This principal embarked on an ambitious plan to re-develop the assembly hall and music department into a combined performing arts space optimised for performance and designed to incorporate a high level of technology relevant to music education. The head of department introduced a number of music courses with a strong emphasis on performance and composition using digital technology, which she believed were more accessible for the students now attending the school. Following this, numbers taking music improved and music classes became popular with the students once again. The construction of the new building was completed and provided superb facilities both for students and for staff.

School D has one of the most modern music suites in the city and the two recent heads of department have worked hard to incorporate a very high level of technology into a range of courses offered in the music department. Considerable time and effort was given to growing the department and all of the music teachers working at School D teach general classroom music as well as taking individual or group lessons as part of the itinerant hours allocated to the school. Some of the itinerant teachers were replaced by others with a more contemporary background so there was a greater connection with where the students' musical interests lay. Music has flourished in the school for the last seven years and students have enjoyed considerable success in both rock and jazz festivals and specialist competitions such Pasifika Beats, a music festival created specifically for Pasifika students involved in music and performing arts.

In addition to the usual music courses offered by the school, a contemporary music academy was established to support senior students wishing to work in the music industry. These students spend most of the day concentrating on their

performance skills and learning how to use a range of digital technologies used in the recording industry. In this academy, the students work towards completing specific unit standards[4] in both performance and composition as well as in audio engineering and recording. The academy has direct links with a local polytechnic providing a pathway for students to follow if they wish to pursue a career in this area.

9.1.1 Introducing Ms Saxophonist, Mr Drummer and Mr Guitarist.

The music department at School D is visible from the road and is one of the two modern buildings visitors to School D see when they first arrive. The department is a very modern design and was designed to sit behind the assembly hall. Two teaching spaces are located on the right of a wide main corridor with a specialist, networked computer lab placed between them. The rooms are large and easily accommodate a number of keyboards used in classroom activities, a drum kit and other assorted drums connected with Polynesian performing ensembles, guitar and bass amplifiers and synthesisers. The teachers' workroom is located at the end of the corridor, which then turns to the right and four practice rooms, all equipped with drum kits, assorted guitar amplifiers and keyboards are located on one side of the corridor that extends beyond the teachers' workroom. A larger practice room is also located directly behind the teachers' workroom and it houses the music academy recording equipment. In this room, there is a considerable amount of equipment. It comprises a large, digital mixing console, an impressive collection of high-quality microphones and stands, a computer with dedicated music recording software loaded on it and numerous cables, leads and plugs. The department was alive with the sound of all kinds of contemporary music ranging from a small jazz ensemble rehearsing in one of the classrooms through to a group of Pasifika students singing a Capella in

[4] Unit standards are competency based and are assessed as pass/fail. They are developed by the relevant industry and students can earn credits by completing them that contribute to their NCEA achievement at each level.

preparation for an upcoming vocal competition. In the room dedicated for recording, two students were completing the final mix of a hip hop piece they had been working on over the last month.

I met the head of department, Ms Saxophonist, in the teachers' workroom. At the time of initial data collection, she had only been at the school for nine months. While I had spent considerable time at the school with the previous head of department, I had not met Ms Saxophonist before and I was interested to see how our meeting would progress. School D was one of the first schools in the city to create a purpose-built computer lab as part of the music department. I had been interested in seeing how the previous head of department had incorporated digital technology into the music programme at the school and regularly visited to see how she, and the other music teachers, used GarageBand as part of the activities prepared for the general music classes. The previous head of department was sure that the use of this software had a major impact of students becoming interested in studying music. This was one of the precursors that informed this particular study.

Ms Saxophonist had an extensive background in contemporary including an impressive qualification in jazz and was very experienced when working with digital technology. Ms Saxophonist told me about her previous position in a small rural high school and how different it was working at School D. She said she was aware she had quite 'big shoes to fill' at School D as the previous head of department was very popular with the students at the school, enjoyed a very good relationship with the wider school community and in particular with the Pacific Island families. She told me she had found it extremely challenging coming to terms with working with the Maori and Pasifika students. Ms Saxophonist explained that it had taken her about six months to earn their respect and trust. She was quite candid about her initial

experiences, saying that at times she was almost ready to resign as she found some of the students so challenging to work with. In the end, she said she relied heavily on Mr Drummer and Mr Guitarist to help her win the students over. Both teachers had worked with the previous head of department and were able to help her adapt to the special approaches needed to connect with the Maori and Pasifika students. She also had been in the same class as Mr Guitarist at Jazz School and they knew each other well and enjoyed a very positive working relationship.

I asked Ms Saxophonist how she was finding working in a school with a considerable number of computers loaded with GarageBand available for the students to use. She said she was initially a little surprised at how much emphasis had been placed on using GarageBand with the junior classes. However, she had found ways to adapt what she had done at her previous school and was now starting to incorporate some of her own ideas into the pre-existing music programme. She described a range of structured approaches to song writing that used with some success at her previous school. While talking about this, I noticed she was becoming more and more animated about what the students were able to achieve using that software. As part of the discussion, she mentioned two students' work on a number of occasions. I asked her about this and she said that both students, one Year 11 and the other Year 13, were both working in a practice room at that moment and she took me to meet them. The boys were initially very modest about the standard of their work but after we had talked for a while and I explained why I was at the school and meeting with Ms Saxophonist they were happy to show me what they had done. The Year 11 student had created a sophisticated hip hop piece where he rapped in Samoan about the challenges facing a young Samoan boy in this particular part of the city. The Year 13 student had created something similar but instead of using pre-recorded loops

available in GarageBand, he had added a number of real instruments including bass guitar, electric guitar and a number of vocal overdubs where he had sung all of the parts. This was very sophisticated song and particularly high quality and I was very surprised that he had created it all using GarageBand. The quality of the recording was such that my initial thought about the piece was that he must have used the academy recording studio and had been working with Mr Drummer. I suggested this to him and he said that he had only used GarageBand to write this particular song and talked about plugging the guitars into the computer and using the Real Instrument function in the software to record the various parts. When we returned to the teachers' workroom, Ms Saxophonist said that those songs were typical of the work the students at School D could produce. She said that they were very different from the kind of songs the students at her previous school used to write and that she was very impressed with what they could create. She said the boys had written very creative and sophisticated pieces but, unfortunately, they would not be eligible for consideration in the composition achievement standards for NCEA because the students could not notate them using traditional music notation. I asked her why she did not teach them to use Sibelius, as this could facilitate the process. Her reply was that the boys were so used to using GarageBand (which does have a limited notation function) that they preferred to see the visual representation of the parts instead of notes on a stave.

Mr Drummer and Mr Guitarist then joined us and we continued to discuss the project, what I hoped to discover from my research, and how they might help. I knew Mr Drummer as he had worked at School C for a number of years. At the time, he indicated that he had a real interest in introducing a high level of digital technology into general and performance music classes. When a vacancy became available, Mr

Drummer moved to School D. He made this decision, as he wanted to develop his skills with digital technology to a higher level and was responsible for teaching the courses offered in the Music Academy. As a result, he only taught two junior music classes. Mr Drummer had also attended Jazz School and had majored in drums and percussion. Mr Guitarist was employed primarily as a guitar tutor although he too taught a junior class allowing Ms Saxophonist time to teach saxophone. All of the teachers had completed their questionnaires separately and, due to their teaching timetables, were interviewed separately.

9.1.2 Music at School D.

The current school curriculum for Year 9 has music as one of the arts group of subjects students select for one semester. Music is offered as a full-year option in Year 10. Music is also offered for all NCEA levels with students combined in Years 12 and 13. Scholarship[5] music is not offered at this school. School D offers unit standards in music in combination with NCEA. Ms Saxophonist describes many of the students who opt for music at this level as having superb performance and composition skills but little knowledge of traditional music notation and theory. Students with real ability in music and lacking interest in traditional school subjects are able to join the Music Academy in Year 12. These students complete relevant unit standards in recording and production techniques as well as contemporary music performance.

Tuition in a range of instruments is available at School D, but the majority of students receive tuition in contemporary instruments such as guitar, bass and drums. Ms Saxophonist teaches saxophone, Mr Drummer drums and Mr Guitarist guitar.

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[5] Scholarship provides recognition and monetary reward to top students in their last year of schooling. Scholarship exams enable candidates to be assessed against challenging standards, and are demanding for the most able candidates in each subject.

These individual and group lessons are included in the teachers' workload. This combination of instrumental and classroom teaching is unique to School D. The teachers said they enjoyed teaching this way as they had the opportunity to get to know the students they were teaching and they felt their credibility as musicians and teachers was enhanced.

In recent years, School D has entered a number of rock bands in Rockquest and Pasifika Beats competitions and is slowly developing a jazz band. Ms Saxophonist indicated that increasing the profile of the school's range of musical ensembles was a priority for her. The drama department at School D has enjoyed national recognition for their work in the national Shakespeare festival and she said that she was keen to see music enjoying the same success as drama has for the school.

9.1.3 Students at School D.

School D has the lowest decile rating (2) of all the schools involved in this study. A decile rating is an indicator of the socio-economic area in which the school is located. A decile rating of 2 would indicate a fairly low socio-economic area and may include a high proportion of single-parent families with many dependent on welfare benefits. Low-decile schools are often located in areas where there are a high proportion of Maori and Pasifika students. School D has faced the difficult situation of a falling school roll for a number of years and successive principals have worked hard to try to encourage students back to the school. The development of the academies as described earlier in this chapter provided a pathway for students to combine their passion for sport with formal academic studies allowing them to stay in school for longer than many have been expected.

The students involved in this study came from one of the semester-long Year 9 general music classes. This class was small compared to other similar classes in

schools participating in this study. From this class, five students volunteered to participate in the group interview. In the group were four boys and one girl. Three of the boys identified as Maori, one identified as Pasifika and the remaining girl as New Zealand European. Three of the boys said they played the guitar, the remaining boy said he would like to learn an instrument. The only girl in the group said that she too would like to learn an instrument.

9.2 Composition Using Digital Technology

School D uses GarageBand to teach composition in junior classes. School D is in the fortunate position of having 25 individual Apple computers, all networked and all equipped with QWERTY keyboards and small music keyboards connected to them via a USB connection. Year 7 and Year 8 students from local contributing schools who travel to School D once a week specifically for music classes also use these computers. Ms Saxophonist and Mr Drummer commented that they were extremely fortunate to have such a resource readily available. They also said School D was very fortunate to have a dedicated IT support person who was comfortable working with Apple products and who understood how to network the computers allowing easy storage for students' individual files. They said the computers worked very well and it was very rare for students to have difficulties logging on, saving their work or retrieving work they had done in previous lessons. Ms Saxophonist, Mr Drummer and Mr Guitarist referred to accessibility as being the greatest advantage GarageBand provided students when teaching composition. Ms Saxophonist said that she felt using GarageBand was fun for the students and they could quickly create something that they were pleased with without having to have a great deal of theoretical knowledge. Mr Drummer's perception was GarageBand allows the students to create music without the requirements of a more traditional approach to composition using notation

and music theory. Mr Guitarist discussed this directly when referring to using GarageBand in his classes:

> It means that there are a whole lot of students who don't have necessarily great, strong musical theoretical backgrounds, can come in and start composing really cool stuff from day one.

Ms Saxophonist described how she taught song writing using a holistic approach where the students were able to make many of their choices before sitting down with the computer and starting to write their piece. She said that in many cases the students seemed to be able to write well-structured work almost instinctively:

> They are so full of ideas and they can play their ideas in and then we can … it is almost like doing it in reverse, their ears are so good, that they naturally write things that have great form and good ideas and extension of ideas, but, they tend to do it by ear. Afterwards you can look at it and say 'oh look, what you have done there?' and they can say 'I have used a bit of repetition …' They tend to get their ideas first and then you can analyse them.

Mr Drummer expressed a similar view but commented about what he saw was the natural talent the students possessed, possibly because of experiences they had out of school:

> I think that the greatest advantage is that, especially with these kids, we are talking about where they come from, their socio-economic background and all that kind of thing—music is in their blood. It just tends to be more natural for them and sometimes using this (GarageBand) tends to be a way of discovering a real natural talent.

The teachers at School D recognised that for these students, a traditional approach to teaching composition using music notation and music theory was difficult. However, this did not mean that these students could be described as 'non-musical'. In Case Study 1, I discussed Mr Organist's view that GarageBand was very useful for what he described as his 'non-musical' students and how the software allowed them to create sophisticated composition without this knowledge. Mrs Saxophonist expressed similar thoughts, but in this case saw things rather differently:

> I feel like—saying it is better for the non-musical kids is the wrong way to put it in a way. I would say they are very musical students. Just musical students that haven't had access to instruments or lessons or haven't quite got the confidence to sit in a lesson for 35 minutes with a teacher.

Where Mr Organist, Ms Saxophonist and Mr Drummer did agree was how a number of their students were using their aural skills to create effective, well-structured compositions. Ms Saxophonist said that she had tried early on to teach the students aspects of music theory. However, she said it soon became clear to her that many of the students had an excellent understanding of form and the structure of music and seemed to be able to hear how a song could be constructed without needing to learn how to do it first. She said that in some cases, if she talked too much about form and structure some of the students would lose confidence in what they were doing, and lose concentration thinking that what they were doing was wrong. Mr Guitarist made a series of comments about this too. He said that he was surprised at how skilfully many of the students could recreate different styles of music, particularly hip hop:

> I think the Pacific Island students here, have got a really good grasp of hip hop and are working at a much higher level than what I thought they would. They

> seem to be able to work to a schedule. So for them, one example would be a student deciding to do a 'Bollywood' song and they will just nail it, and he will pull out every element in 'Bollywood'.

The students appeared to like using GarageBand to create their own pieces and songs:

> I like listening to music and like making my own beats. (Student 1)

> I like making tunes and yeah, going on GarageBand. (Student 2)

> I like listening and going on the computer. (Student 4)

These students mentioned listening to music a number of times when talking about music at school and music at home. Music plays a big part in their lives in a range of situations. They described listening to a range of songs of differing styles when in class and said that they found it useful when their teachers played them these songs before setting them work on GarageBand. These songs seemed to be helpful for them when they were writing their own pieces:

> I like listening to music and like all the different tones and that. They help me when I go on the computer and do stuff with GarageBand. (Student 5)

When asked about any negative perceptions the teachers had about using digital technology, each teacher provided a different response. Ms Saxophonist expressed the opinion that even though the students could capture the feel of hip hop really well, they seemed to be 'locked in' to that particular style and she found it difficult to introduce them to different styles or genres of music. A second issue for her was the reluctance of many students to experiment creating their own riffs. She said a common response was 'why would I need to make up a riff when there are a whole lot of really cool ones already there!' She said that it seemed to her that the

students just relied on the pre-recorded sequences for their songs instead of persevering with the software and learning how to make their own. She found this frustrating as she felt many of the students had the potential to create some very interesting work but did not seem to want to take the opportunity to explore their creativity as the students seemed to think that what was available in the loops menu was somehow better than what they might be able to create themselves.

Mr Drummer expressed similar thoughts but added that for some students using the technology available appeared not to be particularly interesting or motivating for them. These students, he said, preferred to play guitar and often he would allow them to do that provided they could come up with something original that they could play. He said he would show the students how they could combine the live instrument with the sequences and loops in GarageBand but such a process was often very time consuming and kept him away from monitoring the work of the larger group. He added that every now and again he would come across a student who just seemed to find the whole concept of using GarageBand too difficult despite considerable intervention on his part.

Mr Guitarist said that he would like to see the students combine loops, sequencers and real instruments to provide what he described as a more ‘organic’ style of music:

> I think you can compose entirely using loops and samples, that is obviously … that is what millions of people do, but I think there is room for more ‘organic’ music as well. Other than just loops and samples, adding an acoustic guitar. Maybe a rock song where there are some loops underneath and that’s … used more and more in pop music too these days.

9.2.1 Performance in the classroom.

School D includes whole-class group performance among the activities the students undertake in the classroom. The approach taken by the teachers at School D is very similar to the approach taken at School C. The students in the class have the opportunity to play either keyboards or guitars and are often accompanied by one of their teachers. Two students play each keyboard with one playing the melody and the other playing the chords. A student playing the chords can play a complete triad or the keyboard can be set to use the 'single finger' chord option where the instrument will play a complete chord when the player only plays one note. The teachers also participate in these group performances playing either piano or guitar. Mr Drummer spoke about what he perceived was the value of such an activity:

> I still believe that the way to go, to keep a class interested, have fun and retain numbers for the following year is practicals. I am a believer of hands on, keyboards, guitars … everything. Make a racket, okay!

Mr Guitarist expressed a similar opinion to Mr Bass Guitarist at School C when discussing the usefulness of practicals, particularly in the context of using digital technology on a regular basis:

> I think performance should still be number one. The student as a performing musician first and then you use technology to help them become a better musician and as an aid to composition, rather than just the reason to do composition because you have the technology.

Ms Saxophonist said she found the large group performance approach used at School D another challenge she had to face when she moved to the school. She was used to fewer students in her classes at her previous school and the students she did

have often were not highly skilled performers. A number of the students in the junior classes at School D were skilled players and would often go off task quickly if they were not being extended or if less skilled students took up more of her time. She explained that the larger numbers at School D posed some management issues for her initially, but she said she was starting to come to terms with what was required to ensure the classes ran efficiently. She added that she had also realised the benefits of working with whole-class practical music sessions.

The students participating in the interview seemed to enjoy the group performance activities too. Student 3 and Student 4 said that they really liked practicals, as it gave them the opportunity to play. Both students played guitar and they said it allowed them to show their friends what they could do on the guitar and to learn from each other in the classroom. These students did not receive formal music lessons at school. When asked where or how they developed their guitar skills, Student 3 said that he learnt by just 'jamming out with my mates'. Asked if this took place at home or at school, he said 'both'. Student C explained that sometimes they would be playing a song that he already knew in class and that he would then show how to play that song to his mates out of normal class time. The students explained that often they would use ideas from songs that they had played in class when working with GarageBand. Sometimes they would 'play in the melody and then add our own beats' or they would try to develop their own riffs based on riffs they had played in the class practical session.

9.2.2 Pedagogical change.

The three teachers at School D said that they had not changed their pedagogical approach as a result of the digital technology available to them. Ms Saxophonist was first to describe how she was still using the same approach to

performance activities and composition activities. However, she said that the resources available at School D made it easier for her to teach in the way she did, as the students could more easily do what she wanted them to do using GarageBand.

Mr Drummer said that an important part of his philosophy of music education was a strong emphasis on practical music making. He viewed keyboards, electric guitars and the like as part of the technology available to him. As such, he said, he had always taught with some form of technology available:

> That question came up and I thought 'No, I actually teach the same way I did'. I still have a great passion for performing and I still have a great passion and belief that you get kids behind instruments and it doesn't matter if it is 'Ode to Joy' or 'Paint it Black or 'The Wall' … it really doesn't matter. They get a kick out of being able to play and then out of being able to play together. And it is more enjoyable, it is more interactive and it is more real!

Mr Guitarist made the point that as the youngest member of the group of music teachers at School D, he had always taught music having access to a range of digital technologies. He was very familiar the kind of software available at School D as he had used it when studying at jazz school and, as a gigging musician playing in a band, he had copies of more sophisticated sequencing and recording software on his laptop. He said he used this when writing songs for the band and for preparing rough arrangements of these songs for the other band members to hear. He said that for him it was an 'essential' tool of the trade'. However, he added that he had found he was starting to change his approach to teaching composition. He described it thus:

> Personally, I have always come from a background of writing an idea on a real instrument, on say a guitar, or piano and starting that idea before taking it to the computer or adding in technology that will bring out bits in the song.

At School D, he said he found some of the students were more reluctant to start working with real instruments first and seemed to think that they were only able to write songs by sitting down at the computer. He said it was a reverse of the approach he would use and although he was trying hard to shift the students' thinking, they appeared rather reluctant to change. Mrs Conductor expressed similar views in the context of School B. This raises an issue concerning students' perceptions of the process of composition where digital technology is available for them to use. It could be argued that this perceived reliance on digital technology as a necessary part of the process of composition has come about because of the emphasis placed on this particular tool as opposed to providing opportunities for students to explore creative possibilities on actual instruments. A counter argument remains that if a student were unable to play an instrument, how would they be able to explore the creative possibilities such an instrument may offer them.

The question of what constitutes an original composition is also relevant in this context. Ever since digital technology was developed that allowed 'sampling' (e.g., the digital recording of a drum beat, guitar riff or even vocal phrases) many songwriters have incorporated this technique into their work. Espeland (2010) raises a number of pertinent questions:

> What kind of digital skills in music education might enhance analogue skills and vice versa? Just how do analogue and digital skills interact meaningfully in music education processes of different kinds (p.129).

Vakeva (2010) discusses the increasing plurality of practices that now constitute popular music. She suggests that the rock-based informal pedagogical approach where songs are learnt by ear from record and then rehearsed in able to perform them live as suggested by Green (2001, 2008) is just one practice. Other

practices such as DJing/turntablism; assembling various bits and pieces to remixes; remixing entire songs to mash-ups in home studios and producing of one's own music videos to YouTube and a range of other digitally creative techniques indicate a culture that differs substantially from conventional 'garage band' practices from the past (Vakeva, 2010).

Mr Guitarist is a skilled performer who has studied jazz performance and has grown up with an instrumental based approach to composition. He told me he started writing songs as a teenager and continues to do so for the band he currently a member of. He described using technology on almost a 'daily basis' when working on new pieces. He said that nearly all the songs he writes start from him improvising on the guitar and finding either an interesting chord progression or even a voicing of chord leading to another chord, and that these serendipitous moments are often the creative 'sparks' that lead to a new song. This way of working would be common among many rock musicians.

Perhaps a new approach that, in time, could be viewed as equally valid will employ only digital media and all 'instrumental' parts will be pre-recorded loops. At present, many music bits and pieces are finding a second life in the digital domain as memes: that is, 'as cultural replicators that pop up in new contexts, mutating into new forms and serving new functions, out of the reach of the original authors' (Vakeva, 2010).

9.2.3 Students' use of digital technology.

The students interviewed at School D had computers at home. They used their computers at home to listen to music. They said that they would often search the internet for information about singers or bands they particularly liked and sometimes they would share this information with friends who had similar interests. Student 4

described a different use on some occasions. He said that as a guitarist, he often used his brother's computer to help him improve his guitar skills. When asked what he did, he replied that his brother had GarageBand on his computer and Guitar Pro. Guitar Pro is another form of notation software, similar to Sibelius, that combines guitar tablature with traditional music notation. It has become popular with guitarists, as it can be a link between traditional music notation and tablature because it will convert music both ways. A piece can be created in tablature and the software will convert it to traditional notation. Student 4 said he used GarageBand either to play existing backing tracks to a particular song or to create his own backing tracks changing the style depending on what he was playing. He described using Guitar Pro as an aid to improving his playing:

> Sometimes, when I want to learn something, I use my brother's computer. It has GarageBand and Guitar Pro and stuff. It can be really useful if I want to learn a new song. Sometimes I can find the tab for something I can't work out just by listening.

Student 2 said that he was a big Bob Marley fan and used the computer to look up information about Bob Marley. He would sometimes search the internet for guitar lessons for Bob Marley songs. He said that some were on YouTube and he could watch what the person playing the song was doing and copy that. Student 5 said that she used the computer mainly to listen to music. If she found a song she particularly liked, she would search for the lyrics and download them for herself and her friends. She said she often used the lyrics to sing along to the song when she was at home.

I asked the students if they felt they were able to do similar things on the school computers as would happen in a modern recording studio. Student 1 said that he had heard on the news that some singers were using computers to 'amp up their

voices and stuff'. Student 2 said that he was sure most performers could play the real instruments rather than using the computer to create them. He added that he knew that you could do things with your voice on the computer because 'I tried the voice mod stuff in GarageBand one day just to see what it would sound like'. Student 4's response was he was sure performers used computers all the time in the studio:

> I think it is actually quite similar 'cause like [Student 1] said, they are using computers these days to make everything pitch perfect and stuff.

9.3 Emerging Issues

The first issue I wish to identify at School D is how the music teachers at the school have adapted their activities to meet the needs of the students attending the school. As part of the re-imagining and resuscitation of music at School D in the 2000s, the head of department before Ms Saxophonist identified that while many of the learning outcomes outlined in the music–sound arts part of the NZ Curriculum (2007) were relevant to the students at School D, the approach to teaching these had to be different. She identified digital technology as being one way of allowing students, in particular many of the Maori and Pasifika students, to participate in creative work without having to spend a significant amount of time trying to teach traditional theoretical concepts to the students. Consequently, of all the schools involved in this study, School D has the strongest focus on contemporary music and acknowledges the connection between contemporary music and informal music learning practices.

This approach is shared among the current teaching staff. Mr Drummer and Mr Guitarist have had considerable experience playing in a range of jazz and rock bands. The benefit of their experience is evident in the way they work with the students. Both teachers initially learnt how to play through informal approaches. They

have credibility with the students because the students know they can play and that they started to learn their respective instruments in a similar fashion to many of the students. These teachers understand that many of the students attending the school have been deeply immersed in informal music pedagogies as part of their culture. They learn how to play the guitar from their friends and relatives. They understand how music works on an intuitive level because it is part of what they have done from an early age.

In contrast, Ms Saxophonist admitted to struggling to come to terms with the demands of the students attending School D. While completing the same tertiary music qualification as the other two teachers, she did not have the same experience with rock music as Mr Drummer and Mr Guitarist, particularly with experience of an informal learning approach to music. Hers was a more traditional music education progressing from recorder to clarinet and then to saxophone. She was taught in a traditional formal manner. She learnt to read music and about music theory while receiving formal instrumental tuition. As a saxophone player, she was more comfortable within the jazz styles and although capable of working with students with a passion for hip hop, she admitted to struggling to connect with it. She also realised that her usual approach to teaching music utilising traditional music theory concepts was not going to work with the students at School D. She realised that the experiential approach expressed rather eloquently by Mr Drummer at the start of this chapter proved to be a far more successful approach.

The second issue I wish to identify concerns the aural skills many of the students display, both in and outside of the classroom. In this context, aural skills refer to the ability the students have to learn to play songs by ear without having to read a notated score, identify chords in a song or play a complex riff after listening to

a recording. The music teaching staff at School D described the sophisticated aural skills many of the students at School D appear to possess. Ms Saxophonist described hearing songs created by junior students using GarageBand that were well constructed using simple chords following traditional chord progressions. She told me that these she believed the students had no concept of the relationship between tonic, subdominant or dominant chords but seemed to know instinctively how a song should be constructed and when to change chords. She said that the students' ears were good enough to hear where the chord changes should go without being able to describe to her using traditional chord terminology how their songs were structured. Her comments echoed those of Mr Organist at School A, who described something similar with some of the work the students at School A had created. In both cases, the teachers believed the students were able to create effective pieces as a result of the amount of music they listened to. The chord progressions contained in the songs appeared deeply imbedded in their memories and they knew when chord changes should occur because of this.

It is an interesting comparison between the comments of the teachers at School D and those expressed by Mr Organist at School A. These music teachers working in schools with very different contexts were saying much the same things about the aural skills that their students were demonstrating. The schools in which they are working are completely different; in fact, it is difficult to imagine two more different schools. Yet, the teachers appeared to be coming to the same conclusions about the aural skills the students possessed and how many of the traditional ways of measuring them, including in the external examination system of NCEA music, seemed entirely inappropriate for them.

Perhaps the most important work examining specifically a different approach using aural skills, particularly in contemporary music, would be the work of Green (2001, 2006, 2008) into how contemporary musicians use what she describes as an 'informal' approach to learning music predominantly by ear. While none of the schools involved in this study have fully adopted the informal approach to music education as developed by the Musical Futures Project, it seems that some of the teachers are recognising the high level of aural skills their students possess. As a result, it seems they are starting to reconsider the traditional approaches currently used to measure such skills and are allowing students to work in a more informal manner. These teachers, for example, Mr Organist at School A, still consider that traditional concepts of structuring music should be identified. However, despite this view, they are allowing the students to create their own work without being burdened by what some students may perceive as confusing and complex rules. The digital technology available to them does seem to allow students to create effective compositions without them needing to have an in-depth understanding of theory and notation just as Crow (2006) suggested.

The third issue I wish to identify relates to the integration of practical music activities with composition. Among the four schools involved in the study, School D combines practical music making directly with composition more than the other three. The teachers at School D run practical sessions using keyboards, guitars and drums and then link the music they have played in class to composition activities. The students like having the opportunity to take melodies from pieces they had played in class and working on developing different accompaniments to them using the loops and sequencing functions available to them in GarageBand. The students described doing this in the group interview. While a similar number of computers are available

for the students at School A, Mr Organist combines listening activities with composition (his 'aesthetic' approach in Year 10) without many opportunities available for the students at School A to perform music in the classroom. School B and School C have a very strong performance programme in place and composition in those schools is taught in a very structured fashion using Sibelius. Neither of those schools uses an equivalent piece of software like GarageBand for composition. While the teachers at Schools B and C described some links between the practical and composition work, School D has the most integrated programme in this regard.

The teachers at School D argued that a knowledge and understanding of music notation and music theory remain as important skills for all musicians. These teachers referred to the importance of an understanding of the language of music in their responses in the initial teacher questionnaire. However, they appear to have adopted a more experiential approach to teaching these concepts. Mr Drummer spoke very emphatically about the importance of practical music making as being the way to 'hook' students into music. His view was that getting students playing first and then making connections from the music or song they have played to musical concepts was more effective and more interesting for the students rather than bombarding them with musical concepts first. Ms Saxophonist said that she had changed her approach when she discovered how sophisticated some of the students' work was. She was now working on a 'play or write first—then explore concepts' approach.

At School D, the teachers make deliberate choices about the pieces the students play in class. The students then have the opportunity to explore some of the concepts on their own, when working on a composition activity that uses some aspect of the piece they have just played. This might include reproducing a particular structure or using a riff they have played in a different way. It is when they are

working on their own in the computer lab that the teacher may identify some particular music theory concept. Often, this occurs when a student writes something that uses this concept without knowing why it works or does not work as the case may be.

Bolden (2009) describes a similar case in Canada where a music teacher highlights music theory after the students have tried something that may or may not work. This 'just-in-time' approach seems to be more relevant and more effective than just learning theory for theory's sake (Bolden, 2009). Just how to teach notation and music theory that is both interesting and relevant will remain a challenge for the teachers at School D as long as there remains the requirement for students to have such skills in order to succeed in a number of the achievement standards in NCEA music.

9.4 Summary

This case study shows how three teachers working in School D are using digital technology in a way that is designed to engage the students in activities in their music classes that are accessible and relevant to their experiences. They have accepted that many of the students attending this school do not have the same prior musical experiences as many of the students attending School A, School B and School C. In an attempt to meet the needs of these students, the teachers are working hard to engage the students through an experiential approach, which may be viewed as almost the opposite to many of the traditional music education approaches. This approach allows the students to use their natural musical skills and has a strong practical focus. However, the music programme at School D has been developed to connect the practical activities with composition in such a way as to have real coherence. Students can take aspects of what they have done in their practical sessions into the computer

lab and incorporate them in their own work when working with GarageBand. The teachers have worked to remove many of what they believe the students see as barriers to music by allowing them to utilise their aural skills in both practical and composition activities. The digital technology that is used on almost a daily basis at School D plays a significant part in the success these students are able to experience in music classes at the school.

Chapter 10: Discussion

This chapter presents a discussion of the technological, socio-cultural and pedagogical implications for future music educators surrounding the ongoing use of a range of digital technologies in the music classroom. It asserts that while the teachers in the four schools use digital technology regularly as part of the activities students engage with while in their music classes, these activities are heavily influenced by a range of teacher beliefs including an underlying philosophy of music education, socio-cultural factors and curriculum requirements, much of which in turn is heavily influenced by practices associated with Western art music. It also asserts that the students the teachers are currently teaching, and those they may teach in the future, possess a high level of digital literacy, having grown up surrounded by a plethora of digital devices. The place of music in popular culture combined with the rapid pace of technological development and increased democratisation has transformed the wider context for music education. Students are now coming into music classrooms with an enormous range of musical preferences and references. These students may be more knowledgeable, skilled, opinionated and personally motivated about their music learning than previous generations (Zereson, 2012).

10.1 Technological Considerations

The use of digital technology was fundamental to the topic of this study. The four schools participating in this study had a varied range of digital technologies available to both teachers and students. The study demonstrated clearly that the teachers and students accepted that the use of digital technology was now an integral part of the activities undertaken in both general and performance music classes (Cain, 2004). Contemporary digital technology, particularly the sequencing and notation

software described in this study, can facilitate sophisticated and complex outcomes in composition in a number of genres and styles of music.

10.1.1 Technology as an enabler not a barrier.

The data gathered in this study suggest that the digital technology available to the students has the potential to enhance their creativity, especially in composition. In particular, the study shows that sequencing software, such as GarageBand, has the potential to allow students with little or no formal understanding of traditional notation and theory, or with little or no experience of formal instrumental tuition, to create sophisticated and complex pieces of their own as described by Crow (2006). For many of these students, the software and what it allows students to do, becomes a source of creativity in itself. The pre-recorded loops, which come packaged as part of the sequencer, provide them with instruments and/or rhythm patterns that they cannot play. Findings from the data show that they are able to manipulate these loops, modify them if they want, combine them with different sounds, sample sounds to create new loops and combine them in a multitude of different ways very much in keeping with the new forms of creativity in the digital domain. The students possess a high level of digital literacy and are able to manipulate sounds quickly and easily. They enjoy working in the digital environment and know how to create effective pieces using the software available to them.

These new forms of composition may be challenging for music educators as they may be considered either not original or as some form of plagiarism. It may be necessary for music educators to reassess their assumptions about originality and borrowing, as Crow (2006) suggests. However, if we conceive that the loops, samples and the like are part of the Cultural Commons as described by Goetz (2004), it may be that instead of viewing the use of these items in a negative light, a new role for the

music educator could be to guide students to find interesting ways to employ the content available in the cultural commons and to find new approaches to them that might result in individual expressions (Vakeva, 2010). In other words, music educators need to familiarise themselves with the nature of the musical *input* that their students make when working in this manner. They need to work as *enablers* who accept that this is a new environment and one that is different to what they, as music educators are used to working in. Only by doing this will they be able to fully support their students. Music educators need to be aware of the creative possibilities of such technologies, as described above, as well as developing an understanding of the traditions and contexts of genres of styles. The historical background related to digital technology use in music with remixing is often associated with hip hop and dance culture DJs. For music educators, who often find themselves in culturally complex classrooms, the ability of the music tools that digital technology can provide to cross boundaries within the context of *authentic* musical expression should be recognised (Crow, 2006).

At the United Nations Educational, Scientific and Cultural Organisation's (UNESCO) second World Conference on Arts Education held in May 2010, three goals for arts education were formulated in the 'Seoul Agenda: Goals for the Development of Arts Education' (Leong, 2011). Leong argues that music education needs to join forces with this proactive international effort and play its part in the constructive transformation of educational systems that are struggling to meet learners' needs in a rapidly changing world. This change is characterised by rapid and remarkable advances in digital technology on the one hand, and 'intractable social and cultural injustices on the other' (Leong, 2011 p. 240).

The Seoul Agenda calls upon UNESCO member states, civil society, professional organisations and communities to recognise its governing goals, work to employ the proposed strategies, and to implement the action items to: 1) realise the full potential of high-quality arts education; 2) renew educational systems; 3) achieve social and cultural objectives; and 4) benefit children, youth and lifelong learners of all ages (Leong, 2011). With these goals in mind, Leong suggests that music education approaches should be evaluated to see whether they support learning strategies and activities that value individualised and group learning; integrate music and arts into the daily life of learners including extending beyond the school setting; utilise gaming and 3D technology and immersive environments; contain a balance of physical, cognitive and metacognitive elements; provide real-time continuous feedback; and are based on open platforms, contents and channels.

10.1.2 Technology and digital literacy.

As described in Chapter 2, there is an expansive literature associated with the concepts of digital literacy. Savage (2012) builds on this and provides a list of skills he believes is needed to use digital technology effectively. This list includes cognitive skills; practical skills; communication and control; reading with meaning and writing with meaning; functioning effectively in a community; applying skills within a social context; demonstrating skills; enriching and transforming thinking; empowering the intellect; understanding the relationship between the individual, others and the wider world; developing goals and visions; conveying thoughts, understanding, interpretation, beliefs, attitudes and emotions. All these skills, he argues, are also musical skills and he believes the challenge for teachers is to find meaningful and creative contexts in which these skills can be developed systematically in the students the teachers are teaching. These skills are particularly relevant to this study.

The research in this study indicates that the teacher participants are working with the students most often at the level Martin (2009) describes of *digital competence*. The students were engaged in tasks that initially involve skill acquisition by preparing and publishing digital resources using software tools with activities devised by their teachers. Students at School A, School B and School C were required to complete highly structured tasks that were designed to provide an understanding of the operation of the software and allowed some individual choices. In effect, all the exercises did was to prepare the students to be competent users of the software.

Occasionally, as evidenced by some of the work by students in School A (in Year 10) and School D, there was evidence of *digital usage* where the students were able to build on these digital competencies and shape them according to the particular expertise of the individuals, their life history and their wide experiences. The Year 10 students at School A were required to complete tasks that incorporated a range of digital literacy skills when working on the more authentic tasks that Mr Organist prepared. He was aware that the students had skills at this level and had prepared tasks that allowed the inclusion of multimedia and multimodal work in a more creative context.

Leong suggests that learning about music through the implementation of digital technology should go beyond what he calls the *core* studies of sound and its properties, basic audio processing, use of MIDI, basic audio recording and utilising sequencers. Currently, the participants in this study are working at this lower level where basic skills are being taught and beginnings of sound manipulation through digital technology are explored. Music educators should help facilitate ways of developing higher-level skills in such a way as to empower artistic expression and

work to develop strategies that locate music effectively as an essential integral and vibrant part of human lives and civilisation.

The students in Year 9 at School D also had the opportunity to work at this higher level. The classroom performance pieces were connected to the composition tasks they were required to complete. Students had the opportunity to work with the melodies from the pieces and re-work an accompaniment. They could change the genre and/or style of the piece and were encouraged to explore the possibilities that the software allowed, particularly in changing the sounds, textures or rhythm patterns contained within the loops. They were encouraged to use experiences from the context in which they lived to inform the choice of genre they wished to work on.

However, real *digital transformation* appeared elusive and although there was some evidence of a growing need to change their use and application of digital technology by some of the teachers, it was evident that other, more important, factors came into play. At the time that this research was conducted, the requirements of the relevant composition achievement standards was a key factor in informing the choices the teachers were making. The need to notate compositions and the descriptors included in standards for assessment were clear drivers for the teachers. While acknowledging that with the recent curriculum realignment this requirement perhaps will not influence teachers' choice to the same extant, it remains to be seen if the teachers will choose to re-develop the current tasks to allow greater freedom of expression by the students. Just how to facilitate *digital transformation* in a musical context will remain a significant challenge. However, as Savage (2012) says, there is the potential for significant rewards when we contextualise digital literacy and the associated skills and competencies within the field of music education. These skills in digital literacy need to be integrated alongside those specific skills that are accepted

universally as a necessary part of music education. Teachers need to think and act creatively. Teachers need to have the opportunity to explore what might be happening at the margins of music education, as often that is where the most creative work occurs.

10.2 Socio-cultural Considerations

The study adopted socio-cultural theory as described by Hennessey, Deaney and Ruthven (2005), Kelly (2006) and Somekh (2008) as a way of interpreting teacher decisions and actions surrounding the implementation of digital technology in their respective schools. The contrasting and intersecting experiences of the participants' influenced by the school environment in which they work, shaped their responses to the affordances digital technology may have and as a consequence shaped the range of activities they adopted as part of their current classroom practice. It contributed to the tensions the teachers experienced when considered how to implement digital technology in their classrooms.

10.2.1 School environment.

Activities in schools and classrooms cannot be viewed in isolation because they are co-constructed by the teachers, the school and the school communities (Somekh, 2008). In every case, the school environment was different, even if some of the external factors were consistent across the four schools. An important consideration to include here are the regulatory frameworks and the requirements of a national qualification as these can have a considerable impact on what teachers may or may not do with the digital technology available to them. Teacher expertise is closely linked to the circumstances to which it pertains; not just to precise situations, but to particular working practices and their associated ways of thinking that help define their school circumstances (Lave & Wenger, 1991).

In Schools A, B and C, the requirements of the national examination (NCEA) proved to be the most important factor influencing teacher decisions concerning the use of digital technology in the classroom. The requirements of the achievement standards in composition appeared to have the greatest influence on the range of activities teachers prepared for students in general and performance music classes. In three of the schools, the teachers had prepared a series of carefully structured exercises that students had to complete and these were used to teach the students how to use Sibelius. The participants did this to develop students' skills and knowledge about the software so they are familiar with it when working on the composition achievement standard at Level 1 for NCEA music. Even though the participants acknowledged that they had many students in their music classes who played contemporary instruments, they were clear that all the students, irrespective of what instrument they played, needed to be able to use this specific software to prepare a notated score to meet the assessment requirements of that particular achievement standard.

In the two independent schools, Schools A and B, the expectation of high achievement by the students in the achievement standards in all subjects was very evident. The teachers in these schools described the pressures they were under concerning achievement both inside and outside of the classroom. While they were working very hard and had produced excellent results in a number of national and international co-curricula events, they described the continual pressure they were under to produce excellent results in NCEA. As a result, they began preparing students in Year 9 to use Sibelius so that by the time they reached Year 11, they were familiar with the software and could use it to create notated compositions. The very structured approach adopted by the teachers in the two schools was designed to allow

familiarity of the features of the software by the students and compositional devices and techniques, as contained in the descriptors for the standard were introduced in careful stages. By doing this, the teachers were reinforcing traditional approaches to composition that would meet the needs of the achievement standards.

Mr Bass Guitarist did a similar thing with the students in the performance music Year 10 class at School C. Although he adopted a different style that was more contemporary in both feel and appearance, the result of the task was much the same as in the two independent schools. The students needed to develop familiarity with the functions of the software in order to complete the requirements of the composition achievement standard at NCEA Level 1.

In School D, the teachers adopted a different position concerning NCEA. As described in Chapter 9, they had realised that many of the students that they worked with in their classes had exceptionally good aural skills and could use these skills to construct imaginative and effective compositions. While Sibelius was available for senior students to use if they wished to create a piece with a notated score, it was not used with the junior classes. The teachers made this choice based on their experience with students who had little or no experience of music notation and were reluctant learners when it came to working with music theory. Even though a simple task sheet was used to introduce the students to GarageBand, the students had considerably more freedom to work on their own with the software, rather than following a structured series of exercises prepared by their teacher, as was the case in the other schools. In many instances, the students were utilising the pre-recorded loops in their pieces and then recording their own original parts, parts that they could play but not necessarily notate in a traditional manner. As a result, the students produced recordings of their work without an accompanying score. By the time the students reached Year 11, they

were able to meet the requirements of the composition Unit Standards and still received credits contributing to NCEA for the work they produced.

While conducting a participant observation at School D, I watched Ms Saxophonist working with a group of senior students. These students had written a song using GarageBand to record the parts. The chord progression that provided the basic structure was fairly simple and the students were discussing what they might be able to do to make the song more interesting. Ms Saxophonist suggested changing the chord structure in the 'middle eight' section of the song to include different voicings of the chords and including minor 7ths. The students were intrigued by the possibilities of this and first started playing the chords on a keyboard and then guitar that they have with them. They liked the suggestion and proceeded to re-record that part of the song having taken Ms Saxophonist's suggestion and worked it into their song. They then asked about other things they might be able to do to chords and she started showing them suspended 4ths and major 7ths on various chords. Part of this discussion included aspects of traditional theory.

This vignette provides an example of the role of the teacher in this digital world. The students had the skills and knowledge to create an effective piece using digital technology. They had developed good critically reflective skills and recognised that a part of the song lacked something and had asked for suggestions from their teacher. She had provided them with a few alternatives, which they then adapted and included in their work. The students then requested further information and their teacher provided it and related it to music theory. She had made a connection for the students between their musical world and hers and as a result, their work had benefitted from the interaction.

10.2.2 Teacher beliefs and knowledge.

Central to any discussion about teachers changing their practice in response to new technology is an understanding of how teacher beliefs and knowledge can influence the decisions the teachers make. In the same way that I have discussed the importance of the context in which they work, I will now discuss aspects of teacher beliefs and knowledge. Researchers examining teacher learning have increasingly turned to socio-cultural views of teacher learning predominantly located in the views of Lave and Wenger (1991). Although numerous theories and views fall into the broad socio-cultural perspective, for the most part they share similar assertions concerning teacher learning (Kelly, 2006). The following assertions are relevant to this study: expert teachers have an active and productive relationship with their knowledge in and knowledge of practice (Schon, 1987); teacher expertise is closely linked to the circumstances to which it pertains, not to precise situations, but to the particular working practices and their ways of thinking that define their school circumstances (Lave & Wenger, 1991); and teacher identities are significant, and revealed in the stances that teachers adopt in their working lives (Wenger, 1998).

Conceptualisations of the nature and range of activities within the music classroom have been informed by the participants' own experiences when learning music, in the teaching of music, through tertiary study in music and in teacher education and their own ongoing professional learning. In this study, the participants demonstrated different expertise in a range of genres and styles pertaining to general music education depending on their own music education background. When devising the study, careful consideration was given to finding schools that had successful music programmes, but with different styles and emphases depending on the school culture, the expertise of the teachers and the context of the student population. The

two independent schools, School A and School B, have teachers with a background in traditional Western art music education. Conversely, Schools C and D, have staff with tertiary qualifications in contemporary music. The beliefs and knowledge of the teachers have strongly influenced the decisions they made as to how they would use digital technology in their general and performance music classes, and, most importantly, what they considered were necessary skills the students needed to develop as a result of the use of this technology. Wenger (1998) suggests that the construction of identity takes place through participation in social situations and through reflecting on and reifying that participation. As social situations privilege certain ways of knowing, they also privilege the construction of certain identities and, as a result, increase the likelihood that a teacher will take one stance over another (Kelly, 2006).

In this study, those teachers with a background in Western art music, working in a school environment where senior management, parents and students have experience of, and place value on this style of music, are using digital technology to replicate or facilitate many activities that have always been included as part of a general music programme, in particular in composition using traditional music notation. The teachers at School C, one with a background in contemporary music, and the other in Western art music, used digital technology in composition in a similar fashion, albeit with a more contemporary appearance, instrument choice and accompanying material. However, the teachers at School D, all of whom had a background in contemporary music, adopted a different approach that was heavily influenced by the needs and the nature of the students attending that school. These teachers acknowledged the importance of traditional skills associated with Western art music, but were sufficiently influenced by the needs of the students to develop

activities that while broadly similar in nature to the other schools, did not place such a heavy influence on a knowledge and understanding of notation and traditional music theory.

However, at this point, it is important to acknowledge that teachers do not simply adopt the identities, which through their affordances, social circumstances assign them. Although affordances make particular outcomes more likely, it may be that practitioners with a strong sense of their teacher identity are less prone to significant influence by such circumstances (Kelly, 2006). In other words, these practitioners might continue to work in the same way they always have while rejecting or actively resisting assigned identities that are not aligned with their existing identities as teachers and their identities in other areas of their lives. In this study, there was evidence of some of the tensions that may exist for a teacher when his or her identity and beliefs are challenged by external factors, such as a changing student population with a high level of digital literacy or skills in contemporary music. For example, there was an acknowledgement by a number of the participants that the students they were teaching had highly developed aural skills that had developed either from the amount of music they listened to or from learning to play an instrument such as electric guitar or drums in an informal learning situation. These aural skills were more advanced and often highly developed but were in different areas than the traditional skills the teachers were used to. The teachers recognised these skills but they appeared reluctant to change the content of many of the activities to meet the needs of these students. It was only in School D that it appeared there were teachers with perhaps more reflective and discursive identities that had, following an ongoing ‘conversation’ with their practice and in collaboration with their colleagues, adopted a stance that responded to the needs of such students.

10.2.3 Intersecting practices.

Despite the apparent differences in the use of digital technology between the schools, there was a general agreement among the participants that the nature of their work was changing as a result of the increased exposure to, knowledge of, and general understanding of contemporary music of the students they were now facing. The participants acknowledged that these students were much more technologically aware than many they had taught in the past. Moreover, there was general acknowledgement that the students listened to a large amount of music in their day-to-day activities, a point reflected in the descriptive numerical student data as described in Chapter 5.

The teacher participants in School A, School B and School D described how this growing realisation of the skills the students had was affecting their views as to the relevance of some of the external examination criteria. As discussed above, the two heads of department at School A and School D described the highly developed aural skills that many of the students they taught appeared to possess. Even though the two teachers came from different music education backgrounds and the socio-economic and, in some cases, ethnicity of their students was very different as well, they both described being amazed at how their students seem to have an intuitive understanding of how songs were structured, or how chord progressions could be used to create effective pieces. They were aware that these students possessed aural skills that were not easily measurable by traditional Western art music approaches. Melodic or rhythmic transcription was something that these students find difficult because of the requirement of having to write down what they hear using traditional notation. However, many of these students would be able to learn to play a melody by ear or repeat a complex rhythm by clapping it. As a result, these participants had started to

prepare activities that allowed the students to use their aural skills when completing them.

The head of department at School B also expressed some concerns as regards the requirements of the composition achievement standards and how a student with a high level of skill in contemporary song writing could have that skill recognised. Even though this teacher had a music education background in Western art music, she acknowledged the importance of contemporary music to the students she was teaching and worked hard to support all of the students both with traditional and contemporary performance skills. She acknowledged that her skills with digital technology supported traditional composition techniques but was aware that for some of the students this approach was not an easy 'fit' for them and she was prepared to invest in different technology to support the needs of these students.

10.3 Pedagogical Considerations

In Chapter 2, I described many of the issues identified some of the commentators (e.g., Dillon, 2004; Hennessy, Ruthven & Brindley, 2005; Way & Webb, 2007) surrounding the implementation and use of ICT by teachers in their classrooms. A common theme among these commentators was that despite the amount of digital technology available to teachers in schools, there remains considerable reluctance to use it. In this study, the evidence would suggest that the teacher participants do, in fact, use a range of digital technologies on a regular basis but the activities the students engage in using these technologies remain fundamentally *traditional* in nature and in most cases are connected with composition. Dillon (2004) argues that teacher reluctance to explore potential affordances offered by digital technology is connected with a preoccupation on developing procedural knowledge and skills of software with an emphasis on student proficiency when using

them. Findings from this study support this claim with most of the teacher participants developing carefully structured worksheets students that introduce students to this procedural knowledge in order to develop proficiency using one particular piece of software, Sibelius.

Way and Webb (2007) examined relevant literature surrounding ICT use in classrooms and found that although there was some evidence of teachers using digital technology in multi-dimensional ways, many were not. A key finding in their study was that despite the substantial use of technology outside of education, there appeared to remain an inherent conservatism within education. Even though digital technology has the potential to enhance the teaching and learning experience substantially for teachers and students, teachers remained reluctant to embrace fully the potential such technology may have. Hennessey, Ruthven and Brindley (2005) argue that teachers should try to work collaboratively to introduce digital technology into their schemes of work and work together to try to overcome some of the constraints they perceive as getting in the way of effective implementation. These include external factors such as requirements of external examinations and internal factors such as the number of computers available for student use and related network capacity.

In this study, there was evidence of many of the issues described briefly above. In most cases, the participants did work collaboratively and recognised the need for consistency in approach when teaching the students how to use specific software. However, the use of the software remained fundamentally procedural in the first instance. Savage (2012) argues that teachers need to acknowledge that teaching music using digital technology is different and requires a different set of skills than those used in traditional approaches. He argues students need to be given time to experiment and explore new pieces of digital technology as well as being given time

and activities designed to master its basic operation. On occasion, the teacher will need to dictate outcomes for particular tasks. However, with other tasks, teachers should build in a level of flexibility that allows students to follow their own interests and imaginations within a broader musical context (Savage, 2012). The requirements of the current curriculum could allow this to happen but, at present, the assessment requirements for music in NCEA, particularly in composition, remain the most important drivers for the older teachers when using digital technology in the classroom. Subsequently, they adopted a fundamentally conservative approach, which was highly structured with minimal opportunities for exploration and experimentation by the students.

10.3.1 Change in pedagogical practices.

Way and Webb (2007) describe a number of changes in pedagogical practice that digital technology may facilitate. Of particular relevance for this study is a move from teacher-centred activities to student-centred activities. I found that there was some evidence of changing practice by three of the teacher participants. These teachers were older and had a traditional music education background. They described their teaching as less teacher-centred and more student-centred as a direct result of the digital technology they used in their classrooms. These teachers described the high level of motivation and interest their students appeared to have when completing tasks using the digital technology available to them and that they felt comfortable acting in more of a facilitating role.

This contrasted with the younger teachers' experiences, most of who had a contemporary music background. They appeared to be used to working in this manner with their students and did not describe such a change in their teaching approach. For these teachers, digital technology was one of the tools they were very familiar with

from their own tertiary music studies. They had spent considerable time working with either notation software (e.g., Sibelius) or sequencing software (e.g., Logic or ProTools) and were familiar with its operation and functionality. This experience provided them with the confidence to structure appropriate authentic tasks and then work alongside the students without having to direct every operation for the whole class. These teachers had explored the potential of the digital technology when they were students and they were more comfortable acting as a facilitator working with individual students. Such an approach resonates with Savage's (2012) comments on flexibility of task and freedom to explore possibilities within a broader musical context.

The teachers in this study used digital technology in their classrooms in ways that they thought would best meet the diverse needs of their students. In line with Burnard's (2007) conclusion, regarding how technology tends to be used in secondary school music classrooms, the teachers were not only using technology to 'serve' tradition but also to enhance the learning experience of their students, at times with, according to the teachers' accounts, some quite dramatic results. The teachers' commentary suggested they were working hard to provide learning experiences for the students that fitted with the lived realities of their world. The teachers, as Woody (2007) suggests, were becoming increasingly aware of the diverse learning needs of their students and were working to develop appropriate activities to which the students could easily relate.

Although teachers' beliefs and attitudes and their confidence and competence with ICT remain centrally important in their adoption of ICT into their pedagogy, teachers are not 'free agents', and their use of ICT for teaching and learning depends on the 'inter-locking cultural, social and organisational contexts in which they live

and work' (Somekh, 2008, p. 458). The teacher participants were beginning to examine their practice in response to the requirements of a curriculum that describes music as music–sound arts and the diverse needs of the students who are arriving in their classrooms. They were looking closely at their beliefs about music education and traditional Western music concepts and understandings and beginning to adapt these to meet the challenges that these students pose (Wise, Greenwood & Davis, 2011).

10.3.2 Change in curriculum.

McPhail (2012) writes about the development of the senior school music curriculum in New Zealand in the twentieth century and argues that it mirrored the parent structure of the more highly valued knowledge of the university. In this curriculum, 'practical elements were rendered secondary to the explicitly cognitive dimensions of analysis, history, harmony and counterpoint' (McPhail, 2012, p. 319). This recontextualisation of music increased its status and enabled its affiliation with other academic school subjects. The preference afforded to classical music over popular music, the emphasis given to developing skills in musical literacy over oral or practical instrumental skills and the ordering of musical knowledge into sequential learning activities, prescriptive goals, tests and national examinations are symptoms of the way music in the senior curriculum has been ordered to reflect the highly valued knowledge of the university (McPhail, 2012).

This preference afforded to classical music and the related skills in musical literacy was reflected in the value that all teacher participants placed on music reading, the awareness of musical structures, and the historical development of musical style along with practical knowledge in music in a range of genres. Independent of background, music notation and knowledge of music theory remained important to them all. Even though, as McPhail (2012) states, 'a curriculum of

cultural transmission centred on classical traditions has largely given way to alternate relativist conceptions centred on popular music' (p. 327), the requirements of the achievement standards appear to demand this continued focus on music reading, music theory, an awareness of musical structures and the analytical skills associated with the study of important historical works.

The role the teacher has to play in this new curriculum with more generic curriculum statements is now even more significant than it was in the past. A particular challenge for teachers is finding a balance for students between recognising their own voice, their musical interests (particularly if they have skills in contemporary music), and emphasising the 'generative conceptual knowledge that underpins the discipline' (McPhail, 2012, p. 328). The teachers in this study were continuing to grapple with the demands of a curriculum that had become more generic, the increasing digital literacy of the students they were working with, the wide range of performance skills on a variety of instruments these students possessed and the demands of the school communities. The challenges they face are very visible when they are working with composition. Few music teachers undertake formal training in composition as part of their own tertiary training and the skills required in teaching composition vary greatly from one genre to another. Most, as is the case in this study, study performance or specialise in general music education. Although the teachers with a background in contemporary music may be more familiar with aspects of contemporary song writing, most of their experience of composition and related activities is confined to preparing arrangements for either large or small jazz ensembles. The curriculum document provides little assistance, stating: 'create, structure, refine, and represent compositions and musical arrangements, using secure

technical and musical skills and technologies to express imaginative thinking and personal understandings' (Ministry of Education, 2007, Music–Sound Arts, Level 8).

The actual assessment standards provide a little more detail by defining technical skills, creative skills and expectations as regards notation but stylistically and technically the possibilities remain wide open. Neither the curriculum document nor the information provided in the composition achievement standard(s) provide information as to whether basic musical tonal grammar along with notation skills are expected building blocks towards increasing compositional sophistication or whether students should be given free rein in terms of compositional style and experimentation (McPhail, 2012).

As discussed earlier, the teachers in three of the four cases tended to remain conservative in their approach, reinforcing the traditional compositional techniques such as repetition, imitation and sequence, as these were the techniques they were most familiar with and could be easily replicated by students in their compositions. There was some evidence of a growing awareness by the teachers of a need to become more flexible and recognise the skills many of the students had developed as a result of informal music learning opportunities but on the whole, compositions were viewed as pieces of music that were created using traditional music notation, containing evidence of repetition and imitation and structured using basic musical tonal grammar.

In the fourth case, things were slightly different. All the teachers at School D had tertiary qualifications in contemporary music, specialising in jazz. These teachers could be described as typical of the new generation of music teachers as they have highly developed performance and improvisational skills. They are very familiar with a range of digital technologies as these are the tools they use on a regular basis if they

are continuing to perform, or as part of their tertiary studies. Although this group also spoke about the importance of being familiar with traditional notation and music theory, and had a good understanding of the harmonic building blocks and musical grammar of jazz, they were prepared to allow the students at their school to experiment with digital technology to a greater extent than the teachers at the other three schools. They appeared comfortable with a more student-centred experiential approach to both performance and composition. They were comfortable recognising the informal music education that many of their students experienced in performance and worked to enhance these skills when working with them in their individual lessons or in solo or group performance situations. They recognised the highly developed aural skills many of their students possessed and adapted the activities, particularly in composition, to allow the students to use these skills without placing barriers in the way such as insisting compositions be notated using traditional music notation. They were prepared to let the students discover the advantages having an understanding of notation and theory may have themselves, and often drew their attention to an important theoretical concept when the students serendipitously created a good teachable moment.

10.4 Summary

In this chapter, I discussed the technological, socio-cultural and pedagogical implications for future music educators surrounding the ongoing use of a range of digital technologies in the music classroom. I examined how the teacher participants are responding to the challenges they are facing, how they are dealing with the tensions created by the contexts in which they work, and described some of the ways they may or may not be changing their current practice as a result. I spent some time discussing the impact that contemporary music practices are having on the current

senior music curriculum and the how technology plays an important part in providing students with little or no formal music education the opportunity to create effective pieces of music without the need to use traditional tonal grammar and music notation. My conclusions based on these findings and implications for future practice are presented in the next chapter.

Chapter 11: Conclusion and Implications

11.1 Revisiting Purpose and Approach

As I discussed at the beginning of this thesis, the current situation surrounding music education is one of complexity and tension. Traditional music education practice, informed by the Western classical tradition, is facing challenges from the recognition of the relevance of contemporary music for young people, the use of digital technologies that can support contemporary music practices and as a subject that is one of four arts disciplines within the Arts Learning Area of the national curriculum. In order to learn more about the nature of music education practice using digital technology in junior classes, this study has investigated the practice of nine music teachers working in four schools recognised by their respective communities as having successful music programmes. These teachers were selected based on their backgrounds and teaching experiences, the particular contexts of the schools in which they work and because they use a range of digital technologies in their classrooms on a daily basis. In accordance with recommendations for case study by Stake (2003) and Yin (2009), in this collective case study, I have provided a rich descriptive account of the school environment, context and music education practice in junior classes in the schools. Such an account contributes to the understanding of how digital technology is being used in music education in the classroom.

As a qualitative study, informed initially by descriptive numerical data, this research provides the fine detail (Cohen, Mannion & Morrison, 2000) of the practice of nine experienced music teachers in four New Zealand schools. The work of each of these teachers was explored through interviews, analysis of relevant documents connected with resources and activities prepared for the students, observation of their practice within the classroom and interviews with their students. The interviews with

the teachers enabled them to provide a detailed account of how music is taught in their schools, how they use digital technology to support a range of activities and how their thinking informed the choices they make concerning their practice. This discussion was contextualised through reference to their philosophy of music education, their teaching experience and their own training in music. Of particular importance was the context in which they worked and the tensions they faced in each of their schools. An examination of relevant documents and resources along with subject observation, helped clarify and confirm the interview accounts. Interviews with the students provided an alternative perspective on classroom practice, activities using digital technology and the nature of teaching and learning connected with this use. This included clarification and confirmation of participants' pedagogical approach in a range of activities and the impact this has on student experiences in the classroom.

Preceding chapters have progressed from a brief historical overview of music education, to a discussion around teacher adoption of ICT, followed by a description of current practice in music education and, connected to this more recent practice, a discussion about the growing importance of the place of contemporary music in music education. These early chapters have provided the necessary context informing this study. The following chapter described the methodology employed to conduct the research. The descriptions in Chapters 6 through to Chapter 9 highlighted some of processes, activities, elements and attributes of digital technology that the teachers implemented in their schools and discussed the responses by a small group of their students in each school to these activities. Chapter 10 provided a discussion on the technological, socio-cultural and pedagogical practices surrounding the use of digital technology in music education in junior general music and performance music

classes. This chapter provides the conclusion to this thesis. This includes final theorising as a result of the findings and outlines some possible implications for secondary music teacher education in the future.

11.2 Findings of this Study

The findings summarised in this section are focused around the three research questions of the study. These include the use of digital technology in junior music classes and the perceptions teachers and students have of this use; the role that the teacher plays in a digital world where much of the technology students use is highly interactive and does not require formal instruction; and the pedagogical approaches and practices used by teachers to meet the needs of students who may be more skilled in the use of digital technology than their teachers.

11.2.1 Use of digital technology in junior music.

This study investigated the ways participants use digital technology in junior music classes in their school contexts drawing on analysis of interviews, classroom observations, examination of relevant documents including prepared resources and student interviews. At the time of data collection, the participants used a range of digital technologies regularly when teaching music in either general or performance classes. The predominant use of digital technology was to support composition activities. Other uses included using YouTube to support individual performance skills, for example, bowing patterns or different interpretations of a song; to provide examples of a specific group performance piece played in the classroom being interpreted by different ensembles; or to demonstrate virtuosity by a range of performers in different genres and styles of music. In one school, one of the participants taught music theory using interactive software.

The choice of software and approach taken to teaching composition within the classroom depended on the context of the school, the underlying philosophy of music education of the participants, their own experiences in music, their tertiary music education training, their training in teacher education and their ongoing professional learning. Five of the participants had traditional music education training and were products of a university system that placed emphasis on developing skills in musical literacy and the ordering of musical knowledge into sequential learning activities. Four of the participants had experience working with contemporary music in both formal and informal contexts. Their tertiary studies placed greater emphasis on performance and improvisation and included specific skills related to the regular use of digital technology to support these practices, particularly in arranging and harmonisation of standard jazz chord progressions.

In three of the four schools, the participants used Sibelius to teach composition skills. In these schools, the participants' reasons for making this choice were the same. At the time of data collection, the composition achievement standards required a notated score. The participants believed that knowledge of notation and music theory was an important part of developing greater musical literacy and that using Sibelius improved these skills. The descriptors for assessment at different levels within the standard refer to traditional compositional techniques such as repetition, imitation and sequence and have an implied expectation that works will be structured using formal harmonic music grammar. Participants start working of developing an understanding of these techniques by their students in their junior classes so that these students are familiar with a range of techniques and structuring devices when they move into Year 11 and begin working with the achievement standards.

In two of the schools, the participants used GarageBand when working on composition activities. In one school, it was used in a Year 10 general music course as the teacher felt it was more accessible and useful for the students at that year level and complemented his underlying philosophy that informed the choices he made for activities with that year group. In the other school, GarageBand was used across all year levels. In this school, the participants had backgrounds in contemporary music, acknowledged and embraced the context in which they were working and recognised the informal music skills that many of the students they worked with possessed. The participants in this school shared a philosophy where digital technology acts as an enabling device and supports students without knowledge of traditional notation and theory to create effective pieces.

11.2.2 Teacher role.

The role of the teacher in a digital world where much of the software encourages exploration and experimentation by individuals is challenging. The participants in this study acknowledged that the students that were coming to their schools were more technologically aware and digitally literate than perhaps those from five years ago. These students are used to working by themselves and have the ability to navigate intuitively when exploring software, including through a range of drop down menus, which provide access to an ever-increasing range of features. From classroom observations, I saw evidence that the students were often moving more quickly through the features and functions of the software they were using than their teachers.

Perhaps one way to consider the role the teacher has when working in this new world is to revisit the list of skills described by Savage (2012) I discussed in Chapter 10. He outlines these skills in the context of effective digital literacy and compares

these to musical skills. The development and enhancement of these skills could be a useful starting point to examine the role of the teacher in this new environment. The teacher has a role in creating a teaching and learning environment that recognises the skills and understanding the students may possess. Creating a sense of integration between activities and allowing creative flow is part of the teacher artistry in this role. Theoretical notions of musical elements and structures can be explored after they have been explored in practical activities. In this manner, the development of critical thought and reflection is reinforced.

The concept of situated cognition is also relevant at this point. Situated cognition relates to the idea that multiple aspects of the learning context (or wider learning environment)—the physical, social and symbolic aspects of the environment—influence people's perceptions and hence what and how they learn (Conner, 2013). Conner argues that students cannot evaluate how well they are learning or what they could choose to do differently to enhance their learning, unless they know about alternative ways to proceed. That is, they need to know what choices they have, if they are to be enabled to make conscious choices. There is also an element of willingness and effort involved in this process that must not be ignored. Students need to know alternative ways of learning, how to weigh up the possibilities and that they can consciously choose or select what to do in relation to task demands. In other words, they must be encouraged to take chances. In order to do this, they must feel safe and be encouraged to do so.

Establishing and maintaining constructive and productive relationships within and between students is also fundamental. Eisner (1974) suggests that effective teaching in arts education may depend more on the personality of the teacher and the ability to form positive and productive relationships with students than on possessing

specific artistic skill. These relationships are characterised by mutual respect, warmth, shared power and a commitment to high standards. In order to achieve this, teachers must work at co-constructing the environment in which the students work. They need to accept that in many cases the students will have the ability to move through features and functions of digital technology quicker than they can. The students may also be able to work independently in genres and styles that the teacher may not be aware of or feel they can identify with. However, the teacher will continue to have a role in supporting the students to make choices and develop critical reflective skills. The teacher will continue to offer alternatives and work to enrich the creative opportunities for students while deepening the level of criticality students bring to their work in music, particularly in composition.

11.2.3 Pedagogical practice.

Having explored the ways that digital technology is used in junior general and performance music classes by a group of experienced music teachers, this study also examined the pedagogical approaches they utilise. Following the analysis of the pedagogical strategies and approaches utilised by the participants, two key categories emerged. In three of the four schools, the teachers used digital technology to support traditional skills, concepts, knowledge and understanding and provided a structured series of tutorials when teaching composition. They did this to enable students to use the software to create traditional music scores. Lesson sequence is designed to increase the level of complexity as the students work through the specific tutorials and creativity tends to come second to functionality; in other words, choice is deliberately limited so students focus on developing knowledge of the various menus and tools in order to create accurate scores. The digital technology was used in the *amplicative* manner, as a tool to do what has always been done, only more quickly and easily.

In the fourth school, the teachers employed a different approach and integrated the performance pieces played in class with composition work using software where notation was not required and students did have a far greater opportunity to be creative. Traditional concepts of composition, while recognised and reinforced, came second to allowing students to explore and experiment, modify and re-record and combine both the pre-recorded loops and, in some cases, the sequences and loops they had created themselves. The approach here was strongly student-centred but relied on shared power and cooperation, part of which is dependent on healthy relationships between teacher and students. The students in this school were encouraged to write in styles they were familiar with, particularly in hip hop and R&B styles, as this was the music with which they were most familiar. Once they had created something, the artistry of their teachers became evident as they worked with the students, often individually but sometimes with the whole class, to encourage further inquiry and critical thinking and reflection on their work.

11.3 Standing in the Light

In Chapter 3, I referred to Paynter's (2003) metaphor of a moving shining beam of light to describe the process of changing knowledge and understanding as described by Cain (2004). Paynter argues that many individuals are comfortable remaining in the centre of the beam. However, curriculum change or significant change in practice may occur when a few individuals feel compelled to move away from the bright centre of that beam of light and start working 'in the shadows' often creating new knowledge and understanding and, as a result, causing the focus to expand (Cain, 2004). Savage (2012) also refers to educators working 'in the shadows' and argues that in this region some of the most interesting and important developments may occur.

As Cain (2004) suggests, the focus of the beam of light has expanded considerably as a result of the introduction of a range of technologies over the last three decades. In this study, the teachers and students have a considerable range of digital technologies available to them both at school and as part of their everyday life. In current practices in music education, the focus of the beam of light has expanded even further as the influence of contemporary music has increased. The privileged position of Western art music in the centre of the beam of light is now being challenged. One result of the post-modern world in which these teachers and students live has been the crumbling of the barrier between high and low culture. It would appear that the barrier surrounding the beam of light that shone on Western art music practices is starting to crumble and the beam has expanded considerably to include 'low' cultural practices, such as those often associated with contemporary music such as informal learning practices and different approaches to composition, aural skills and musical understanding.

In this study, it could be argued that there is evidence that the use of digital technology may be a significant factor in breaking down the barrier referred to above. Technology can allow participants in 'low cultural practices' such as those associated with contemporary music and informal learning skills to cross the barrier and move into the 'light' and participate in high culture practices such as composition without having an understanding of the language and theoretical understanding usually required to complete tasks in this region. Technology could be seen as contributing to the crumbling of this barrier, a barrier that may have doors available for students to go through, but traditionally this has happened only when permitted after they have shown the gatekeeper they possess the necessary skills and understanding to join those standing in the light.

A significant number of teachers participating in this study appeared to be aware of the possibilities that digital technology offered in music education and used a range of digital technologies on a regular basis in their classroom activities. However, in three of the four case studies, students were still required to learn traditional skills associated with notation and music theory before being granted permission to pass through the gate and into the beam of light that 'shines' on Western art music practices. In only one school had the teachers recognised that digital technology could allow students to enter this area by breaking through the barrier that surrounds this privileged beam of light. However, it was evident that the participants displayed an increasing awareness of the possibilities that digital technology offered and were starting to change their practice as a result. They had realised that the students were capable of entering this area on their own; they had the skills and knowledge to use technology to enable this. These students knew that if they did not get what they wanted from formal music instruction at school, they could find what they wanted in an informal setting using digital technology either at home or in another situation outside of a formal teaching setting.

These teachers discussed the issues they faced when working with an increasingly technologically savvy group of students and realised that they were going to have to continue to examine their practice in order to meet the needs of these students. They were able to articulate, in some depth, the real tensions they faced and the pressures they were under to meet the requirements of the Achievement Standards, the expectations of the school managers, the parents and, of course, the students themselves. They deserve considerable credit for the work they put in to cope with these tensions and to maintain effective music education programmes in their respective schools. At no stage in any of the interviews did any of their students

express dissatisfaction with what they were doing in music in their schools. Some said they would like some different activities and would like to be extended more in some cases, but, overall, the students were consistently full of praise for the work their music teachers did across all four cases.

11.4 Contributions to Knowledge

Within the international literature surrounding the use of digital technology in music education, a considerable body of research exists, particularly into the use of technology from a student achievement perspective (Byrne & MacDonald, 2002; Folkestad, Hargreaves & Lindstrom, 1998; Mills & Murray, 2000; Nilsson & Folkestad, 2005; Pitts & Kwami, 2002). Few studies focus on teacher use and perceptions and offer the thick description of classroom practice provided in this study. Further, few studies have investigated the use of digital technology in a New Zealand context. The stories in this study of use and practice concerning digital technology contribute to both the New Zealand music education community and the international community by providing insight into the ways experienced teachers with different backgrounds and in different contexts are interpreting the mandated national curriculum and navigating their way through the tensions and complexities they face working in their particular schools.

An in-depth account of the pedagogical practice of experienced music teachers is provided in this study revealing the significance of pedagogical knowledge and how this is influenced by an underlying philosophy, background, teaching experience and professional learning. While some suggestions as to the use of digital technology in music education are articulated in the relevant Learning Area statements and achievement objectives found in the national curriculum, the practice revealed in this

study demonstrates how this is being interpreted and applied within the classroom in junior general and performance music classes.

As developments continue at remarkable speed in the area of digital technology, specifically in music education, critical dialogue between policy makers, educationalists and music educators must continue to develop in order for music education to continue to be an important and relevant part of education within school settings. This study makes in important contribution to this dialogue by examining the practice of music teachers in New Zealand classrooms in relation to important areas of contemporary educational discourses surrounding the adoption, adaption and implementation of digital technology in the school setting and specifically in contemporary music education.

11.5 Implications for Practice

This study focused on the use of digital technology in music education as perceived by a group of teachers and their students in four secondary schools in New Zealand. The findings may inform the preparation of graduates as secondary music teachers in initial teacher education in other contexts. This study demonstrates that music education in secondary schools is becoming increasingly complex with a number of intersecting factors affecting choices teachers must make when teaching general music courses. This study found that teachers and students in classrooms in New Zealand secondary schools use digital technology on a regular basis. This technology has the potential to transform music education if teachers are prepared to allow students to explore possible affordances, work in genres and styles often informed by the students' experience of contemporary music and have freedom to use and build on the digital literacy skills they may possess.

New music teachers need to be able to ‘walk in both worlds’. The first of these worlds is that of the traditional, formal music educator who has a good knowledge and understanding of the cognitive dimensions of the subject in areas such as analysis, history and harmony, as these skills are those that are measured by the current achievement standards and tend to be valued by schools and the school community. The second world is that of the contemporary musician who may have developed a high level of performance skills as a result of informal music education by listening to recordings, working with other musicians and learning from them or by finding accessible instruction on how to play posted on the internet. In this world, creativity and originality may take a new form, that of the mash-up or the re-mix where new and inventive use is made of existing material. Song structure may be developed purely based on what sounds good, without the impediments of traditional rules surrounding structure, form and general musical construction.

Finally, it may be time to reconsider the position of Western art music as the dominant paradigm within music education. While the importance of the canon of works contained in this genre cannot be denied, Western art music is only one strand of an intertwining web, or braided river of musical styles available to a listener at any one time. Contemporary music may intersect with Western art music but it is not the same and should not be taught the same way. The reliance of contemporary music on various forms of technology and in particular digital technology ‘provides music education with not only the added dimensions of musical sound, creation and production, but also with a means through which music teaching and learning can progress through the interaction of resources, knowledge, artistic expression, individuality, skills, attitudes and experiences’ (Dunbar-Hall & Wemyss, 2000b, p. 29). However, the epistemology underpinning much of contemporary music practices

remains at odds with the epistemology of formal Western education. This new paradigm of music education currently co-exists with the traditional paradigm, which promotes learning through aural skills, performance, creating music and understanding music and has been dominant in New Zealand for the last two decades. Perhaps it is time that the senior secondary school music curriculum is modified to allow for this new paradigm. It may be necessary to write new achievement standards that are more relevant for students with skills in contemporary music and digital technology to allow them to get the same recognition that students educated in Western art music currently enjoy.

11.6 Final Thoughts

The main purpose of this study was to examine the use of digital technology on music education as perceived by teachers and students. This study has produced knowledge of how this technology is perceived by a small group of music teachers and the students that they teach in their schools. It provides an analysis of how this technology is perceived from the perspectives of the participants engaged in the contexts in which they work. The teacher participants described how they used the digital technology available to them in their classroom activities. The student participants described their view of the technology they used in their music classes highlighting their positive and negative feelings about the activities they undertook. While there was some evidence of change in pedagogical approaches by some of the teachers as a result of the possibilities that the technology available to them offered, it is apparent that there is still some way to go as yet, before real transformational change will take place. Burnard (2007) suggests that a universal aspiration for all music educators is to improve the quality of musical learning and its relevance to the young learner. As such, she suggests that we need to consider carefully if a music

teacher's capacity to use technology effectively matches the educational needs of his or her students. As a result of this study, it is evident that the student participants have a high level of digital literacy, are very comfortable using digital technology and use it on a daily basis in many parts of their lives. Music is important to them and they listen to a considerable amount of music using a range of digital devices available to them. They prefer, in most cases, to listen to and work with contemporary music and contemporary music practices. While some commentators warn about conflating informal learning styles with contemporary music (e.g., Allsup, 2008), it is evident that this style of music is most familiar to young people and is the music they are most likely to engage with in an educational setting. Just how to engage with the students while working with a curriculum that supports a range of styles and genres, yet, conversely, reinforces traditional skills in aural, harmony, tonal grammar and music history will remain a challenge and will continue to be a source of tension for music educators. Teachers will have to find a balance between the informal knowledge and skills associated with technology and contemporary music and the traditional disciplinary knowledge associated with Western art music. The potential for transformational change is very real when the dynamic interplay between the different forms of knowledge is acknowledged and pedagogical practices that recognise these different forms are implemented.

Appendices

Appendix A

Instructions for learning how to use Sibelius in Year 9 Performance Music at School B.

Using Sibelius, Task 1 – Year 9 Performance Music

1. Log into the Sibelius Programme by going to the START menu, ALL PROGRAMS, MUSIC APPS, and double click on SIBELIUS 6. Alternatively, if *Sib 6* is on your desktop, open it by double clicking on the *Sib 6* icon. If your desktop is incomplete, restart your computer and try again.
2. Once *Sibelius 6* has loaded (it will take a while) click on START A NEW SCORE in the QUICK START menu and push OK.
3. Ensure that BLANK is highlighted, then click on CHANGE INSTRUMENTS.
4. Under FAMILY select WOODWIND and then under INSTRUMENT double click on FLUTE.
5. Under FAMILY select STRINGS and then under INSTRUMENT double click on VIOLIN I.
6. Still in STRINGS double click on VIOLINCELLO, then click OK.
7. On the new screen click NEXT (this goes to House Style – this can change the font that your score is written in – don't worry about this at this stage) and then NEXT again.
8. Select the time signature as 4/4 and click NEXT
9. Your key signature will be C major (highlighted) – click NEXT

10. If you know your title add it (you can add it later though), add your name as a composer, and click FINISH. A 3-line score should appear.
11. SAVE your work as you go in MY DOCUMENTS. To do this click on FILE (top left-hand corner), SAVE AS, MY DOCUMENTS and then create a PERFORMANCE MUSIC folder, and save your piece in that.
12. Reduce the score size down to 62.5% (drop down menu under HELP).
13. Go into PLAY. If there is a ✓ on LIVE PLAYBACK, click on it so the tick disappears.

14. To create extra bars, select the last bar in the flute part – a blue box should appear around it. Type CRTL B and an extra bar will appear with a double purple box around it. Repeat this again until you have a total 9 blank bars of music. When you have finished just click anywhere to get rid of the double purple box.
15. For the purposes of this exercise you may **only use the notes C, D, E, G and A as crotchets, minims and quavers**. Enter the notes from the keypad window. Select the duration that you want and then click at the appropriate place in the bar. For this the arrow will turn blue – this means that the arrow is carrying information. If you want to get rid of a blue arrow, press the ESC key. Enter the notes in the FLUTE part only, making a total of 8 bars. You will have one blank bar at the end.
16. Note that you can also use enter the notes you want using the appropriate letters on the computer keyboard. You will though have to choose the duration from the Keypad window.

17. To listen to the music you have created, ensure that the PLAYBACK slide in the PLAYBACK window is at the start, and push the green PLAY arrow. To stop the music push the square box button just to the right of the green PLAY arrow.
18. Once you have finished the flute part, you are going to copy it into the VIOLIN part starting at bar 2. To this you
    - Select the first bar of the flute. A blue box will appear around the whole bar.
    - Hold down SHIFT and select the last bar. You should see a blue box appear around all the flute music.
    - Use CTRL C to COPY, and CTRL V to PASTE the selected FLUTE part starting at the 2nd bar of the VIOLIN I part (just as you would do in Word).
    - To get rid of the blue box click outside it anywhere on the screen.
19. In the next blank bar of FLUTE music (which should be your last bar of music), enter the note '*C*' or '*A*' as a semibreve (whichever note sounds best). This will be your last bar of music.
20. Now compose some music for the VIOLINCELLO part. It must
    - **Only use the notes C, D, E, G, A**
    - Be only **2 bars** long
    - Be in a contrasting rhythm to the other 2 parts. For example, if your top 2 parts have a fast rhythm, then your VIOLINCELLO part must have a slower rhythm.
    - Remember you are using the **bass clef** for these notes!
21. COPY and PASTE this 2 bar phrase 3 more times so it fills up the rest of the bars. You will have one blank cello bar at the end – put in either a semibreve '*C*' or '*A*'.

22. Listen to your music (see Step 17). If you like it, carry on. If not, go back and change it until you are happy. **Remember to SAVE as you go.**
23. You have composed **Part A** of your piece of music. Now add 8 more bars.
24. In these new bars compose a melody in the FLUTE part, again using only the notes **C, D, E, G and A**, and using the same note values (crotchets, quavers, minims) as before. It must be a **contrast** to the **A section** of your piece.
25. When you are happy with it, COPY and PASTE these 8 bars into the VIOLIN I and VIOLINCELLO parts. You will have to put the VIOLINCELLO part **down** by either **one or two octaves (8 or 16 notes),** by using the down arrow on the right of the computer keyboard. Remember that the VIOLINCELLO is written in the **bass clef**. This is your **B section** – it should sound in **unison**.
26. Add another 11 bars. COPY and PASTE your **entire A section** into the first nine bars of the 11 bars – select the first bar of the flute part, hold down SHIFT. While keeping SHIFT down, select the last bar of the **A section (bar 9)** in the VIOLINCELLO part and you should see a blue box appear around the whole lot. COPY and PASTE this. You should have 2 blank bars left at the end.
27. In the 2 blank bars at the end, add a little ending for your piece. You may need to change the bar before (with the semibreve in) to get it to sound right.
28. Add 2 blank bars to the beginning of your piece by selecting the first bar and pressing ALT B. A window will pop up asking you how many bars you would like to add. Add 2 bars (these will appear after the first bar) and then CUT and PASTE your entire 1st bar of

music into what is now bar 3 (the 2nd **blank** bar of music). Compose a little 2 bar introduction.

29. Listen to your entire piece of music. If you like it, you now need to tidy it up a little – add a tempo, dynamics, articulations – refer to next sheet. If not, make some changes until you are happy with it.

References

Abbs, P. (2003). *Against the flow*. London, UK: Routledge.

Allsup, R. (2008). Creating an educational framework for popular music in public schools: Anticipating the second-wave. *Visions of Research in Music Education (Special Edition—Beyond Lucy Green: Operationalizing Theories of Informal music learning)*, *12*, 1–12. Retrieved 4 March 2013 from http://www-usr.rider.edu/~vrme/

Ashworth, P. (2007). Electrifying music. A guide to ICT in music education. Retrieved 2 October 2008 from www.musicalfutures.org

Beckstead, D. (2001). Will technology transform music education? *Music Educators Journal*, *87*(6), 44–49.

Belisle, C. (2006). Literacy and the digital knowledge revolution. In A. Martin & D. Madigan (Eds), *Digital literacies for learning* (pp. 51 – 67). London, UK: Facet.

Berkley, R. (2001). Why is teaching composing so challenging? A survey of classroom observations and teachers' opinions. *British Journal of Music Education*, *18*(2), 119–138.

Berkley, R. (2004). Teaching composing as creative problem solving: Conceptualising composing pedagogy. *British Journal of Music Education*, *21*(03), 239–263.

Bogdan, R. & Biklen, S. (2007). *Qualitative research for education: An introduction to theories and methods* (5th ed.). Boston, MA: Pearson.

Bolden, B. (2009). Teaching composing in a secondary school: A case study analysis. *British Journal of Music Education*, *26*(2), 137–152.

Boody, C. (1990). *TIPS: Technology for music educators*. Reston VA: The National Association for Music Education (MENC).

Bosacki, S., Francis-Murray, N., Pollon, D. & Elliott, A. (2006). 'Sounds good to me': Canadian children's perceptions of popular music. *Music Education Research*, *8*(3), 369–385.

Bourdieu, P. (1977). Cultural reproduction and social reproduction. In J. Karable & A. Halsey (Eds.), *Power and ideology in education* (pp. 487-511). New York: Oxford University Press.

Bourdieu, P. & Passeron, J. (1990). *Reproduction in education, society and culture*. London, UK: Sage.

Boustead, T., Greenwood, J. & Alam, S. (2012). Christchurch single-sex state schools opinion survey. Report on an online survery about preferences for schooling in Christchurch, New Zealand (pp. 1–27). Christchurch: University of Canterbury.

Bowman, W. (2004). 'Pop' goes … ? Taking popular music seriously. In C. Rodriguez (Ed.), *Bridging the gap: Popular music and music education* (pp. 29–49). Reston, VA: The National Association for Music Education (MENC).

Braatvedt, S. (2003). Douglas Tayler—A man of action and initiative. *Sound Ideas*, *6*(1), 6–18.

Bray, D. (2000). *Teaching music in the secondary school*. Oxford, UK: Heinemann.

Brown, J., Collins, A. & Duguid, P. (1989). Situated cognition and the culture of learning. *Educational Researcher*, *18*, 32–42.

Bruner, J. (1996). *The Culture of Education*. Cambridge, MA: Harvard University Press.

Bruner, J. (1997). Celebrating divergence: Piaget and Vygotsky. *Human Development*, *40*(2), 63–73.

Burnard, P. (2006). Telling half the story: Making explicit the significance of methods and methodologies in music education research. *Music Education Research*, *8*(2), 143–152.

Burnard, P. (2007). Reframing creativity and technology: Promoting pedagogic change in music education. *Journal of Music Technology and Education*, *1*(1), 196–206.

Burnard, P. (2008a). Creativity and technology: Critical agents of change in the work and lives of secondary music teachers. In J. Finney & P. Burnard (Eds), *Music Education with Digital Technology* (pp.196-206). London, UK: Continuum.

Burnard, P. (2008b). A phenomenological study of music teachers' approaches to inclusive education practices among disaffected youth. *Research Studies in Music Education*, *30*(1), 59–75.

Button, S. (2006). Key stage 3 pupil's perception of music. *Music Education Research*, *8*(3), 417–431.

Byrne, C. & MacDonald, R. (2002). The use of information & communication technology (I&CT) in the Scottish music curriculum: A focus group investigation of themes and issues. *Music Education Research*, *4*(2), 263–273.

Cain, T. (2004). Theory, technology and the music curriculum. *British Journal of Music Education*, *21*(2), 215–221.

Carr, W. & Kemmis, S. (1986). *Becoming critical: Education, knowledge and action research*. London, UK: Routledge.

Cartwright, V. & Hammond, M. (2007). 'Fitting it in': A study exploring ICT use in a UK primary school. *Australasian Journal of Educational Technology*, *23*(3), 390–407.

Cavicchi, D. (1998). *Tramps like Us: Music and Meaning among Springsteen Fans*. New York: NY: Oxford University Press.

CISCO. (2008). Equipping Every Learner for the 21st Century. Retrieved 4 January 2013 from http://newsroom.cisco.com/dlls/2008/ekits/Equipping_Every_Learner_for_21st_Century_White_Paper.pdf

Cohen, L., & Mannion, L. (1994). *Research Methods in Education* (4th ed.). London: Routledge.

Cohen, L., Mannion, L. & Morrison, K. (2000). *Research methods in education* (5th ed.). London, UK: Routledge.

Collins, A., & Halverson, R. (2009). *Rethinking Education in the Age of Technology - The Digital Revolution and Schooling in America*. New York: Teachers College Press Columbia University.

Conner, L. (2013). Students' use of evaluative constructivism: Comparative degrees of intentional learning [Electronic Version]. *International Journal of Qualitative Studies in Education*, 1–18. Retrieved 11 March 2013.

Crawford, R. (2009). Secondary school music education: A case study in adapting to ICT resource limitations. *Australasian Journal of Educational Technology, 25*(4), 471–488.

Creswell, J. (1998). *Qualitative inquiry & research design: choosing among five approaches*. Thousand Oaks, CA: Sage Publications.

Creswell, J. (2001). Standards of quality and verification. In C. Conrad, J. Haworth & L. Lattuca (Eds), *Qualitative research in higher education: Expanding perspectives* (2nd ed., pp. 285–300). Boston, MA: Pearson Custom Publishing.

Crow, B. (2006). Musical creativity and the new technology. *Music Education Research*, *8*(1), 121–130.

Csikzentmihalyi, M. (1996). *Creativity: Flow and the psychology of discovery and invention*. New York, NY: Harper Perennial.

Cuban, L. (2001). *Oversold and underused: Computers in the classroom*. Cambridge, MA: Harvard University Press.

Cuban, L., Kirkpatrick, H. & Peck, C. (2001). High access and low use of technologies in high school classrooms: Explaining and apparent paradox. *American Educational Research Journal*, *38*, 813–834.

Cutietta, R. (2007). Content for music teacher education in this century. *Arts Education Policy Review*, *108*(6), 11–18.

Davis, N., Desforges, C., Jessel, J., Somekh, B., Taylor, C. & Vaughan, G. (1997). Can quality learning be enhanced through the use of ICT? In N. Davis & B. Somekh (Eds), *Using information technology effectively in teaching and learning: Studies in pre-service and in-service teacher education* (pp.14-26). London, UK: Routledge.

Davis, S. G. (2005). 'That thing you do!' Compositional processes of a rock band. *International Journal of Education & the Arts*, *6*(16), 1–19.

Dennis, B. (1970). *Experimental music in schools: towards a new world of sound*. Oxford: Oxford University Press.

Denzin, N., & Lincoln, Y. (Eds.). (1998). *The landscape of qualitative research: theories and issues*. Thousand Oaks, CA: Sage.

Desmond, P. (2002). ICT in the secondary Music curriculum. In G. Spruce (Ed.), *Aspects of teaching secondary music: Perspectives on practice*. London, UK: Routledge.

Dewey, J. (1938) Experience and education. New York: Macmillan.

Dewey, J. (1997). Arts as experience. In D. Cooper (Ed.), *Aesthetics: the classic readings* (pp. 208-228). Oxford: Blackwell.

Dillon, P. (2004). Trajectories and tensions in the theory of information and communication technology in education. *British Journal of Educational Studies*, *52*(2), 138–150.

Drummond, J. (2010). Re-thinking western art music: A perspective shift for music educators. *International Journal of Music Education*, *28*(2), 117–125.

Dunbar-Hall, P. & Wemyss, K. (2000a). Popular music and music teacher education: Relationships between course content and course design. *Research Studies in Music Education*, *15*(1), 50–57.

Dunbar-Hall, P. & Wemyss, K. (2000b). The effects of the study of popular music on music education. *International Journal of Music Education*, *36*(1), 23–34.

Durrant, C. & Welch, G. (1995). *Making sense of music—Foundations for music education*. London, UK: Cassell Education.

Edwards, M. (2005). Music technology: Enthusing & empowering students to compose their own music. Retrieved 9 October 2007, from http://www.efellows.org.nz/efellows05cd/elearning/reports/edwards/START.html

Eisner, E. (1974). Is the artist in the school program effective? *Art Education*, *27*(2), 19–23.

Elliott, D. (1995). *Music matters: A new philosophy of music education*. New York, NY: Oxford University Press.

Elliott, D. J. (2001). Modernity, postmodernity and music education philosophy. *Research Studies in Music Education*, *17*(1), 32–41.

Elliott, D. (2009). *Praxial music education: reflections and dialogues*. New York: Oxford University Press.

Emmons, S. (2004). Preparing teachers for popular music processes and practices. In C. Rodriguez (Ed.), *Bridging the gap: Popular music and music education* (pp. 159–174). Renton, VA: The National Association for Music Education (MENC).

ERO. (2010). School Report—School D. Retrieved 7 May 2012, from Education Review Office http://www.ero.govt.nz

Espeland, M. (2010). Dichotomies in music education—Real or unreal? *Music Education Research*, *12*(2), 129–139.

Estrella, S. (2005). Preparing Tomorrow's Music Teachers [Electronic Version]. *Music Education Technology*, 3, 10-17. Retrieved June 11, 2007.

Finney, J. & Philpott, C. (2010). Informal learning and meta-pedagogy in initial teacher education in England. *British Journal of Music Education*, *27*(1), 7–19.

Firestone, W. (1987). Meaning in method: The rhetoric of quantitative and qualitative research. *Educational Researcher*, *17*(7), 16–21.

Folkestad, G. (1991). Music composition in the upper primary school with the help of synthesisers-sequencers (report number 1991:19). Stockholm, SWE: Centre for Research in Music Education.

Folkestad, G. (2006). Formal and informal learning situations or practices vs formal and informal ways of learning. *British Journal of Music Education*, *23*(2), 135–145.

Folkestad, G., Hargreaves, D. & Lindstrom, B. (1998). Compositional strategies in computer-based music-making. *British Journal of Music Education*, *15*(1), 83–97.

Fraser, D. (2012). The work and artistry of teaching. In C. McGee & D. Fraser (Eds), *The professional practice of teaching* (4th ed., pp. 55–75). South Melbourne, Vic: Cengage Learning.

Gage, N. (1985). *Hard Gains in the Soft Sciences: The Case of Pedagogy*. Bloomington, IN: Centre of Evaluation, Development & Research, Phi Delta Kappan.

Goodson, I., & Managan, J. (1995). Subject cultures and the introduction of classroom computers. *British Educational Research Journal, 21*(5), 613 - 628.

Grbich, C. (2007). *Qualitative data analysis: an introduction*. Thousand Oaks: CA: Sage Publications.

Green, L. (2001). *How popular musicians learn: A way ahead for music education*. Aldershot, UK: Ashgate.

Green, L. (2002). From the Western classics to the world: secondary music teachers' changing attitudes in England, 1982 and 1998. *British Journal of Music Education, 19*(01), 5-30.

Green, L. (2006). Popular music education in and for itself, and 'other' music: Current research in the classroom. *International Journal of Music Education*, *24*(2), 101–118.

Green, L. (2008). *Music, informal learning and the school: A new classroom pedagogy*. London, UK: Ashgate.

Gruhn, W. (2006). Music learning in schools: Perspectives of a new foundation for music teaching and learning. *Action, Criticism & Theory for Music Education, 5*.

Guba, E., & Lincoln, Y. (1981). *Effective Evaluation*. San Francisco: Jossey-Bass.

Guba, E. & Lincoln, Y. (1989). *Fourth generation evaluation*. Newbury Park, CA: Sage.

Hagon, J. (2003). Music education program review. 8–12. Retrieved 9 October 2007 from http://www.berklee.edu/departments/music_ed.html

Hargreaves, D. J. & Marshall, N. A. (2003). Developing identities in music education. *Music Education Research*, *5*(3), 263.

Hargreaves, D. J. & North, A. C. (1999). The functions of music in everyday life: Redefining the social in music psychology. *Psychology of Music*, *27*(1), 71–83.

Hargreaves, D., Marshall, N. & North, A. (2003). Music education in the twenty-first century: A psychological perspective. *British Journal of Music Education*, *20*(2), 147–163.

Hennessy, S., Deaney, R., & Ruthven, K. (2005). Emerging teacher strategies for mediating 'Technology-integrated Instructional Conversations': a socio-cultural perspective. *Curriculum Journal, 16*(3), 265-292.

Hennessy, S., Ruthven, K. & Brindley, S. (2005). Teacher perspectives on integrating ICT into subject teaching: Commitment, constraints, caution and change. *Journal of Curriculum Studies*, *37*(2), 155–192.

Ho, W. (2004). Use of information technology and music learning in the search for quality education. *British Journal of Educational Technology, 35*(1), 57-67.

Hodkinson, P., & Macleod, F. (2010). Contrasting concepts of learning and contrasting research methodologies: affinities and bias. *British Educational Research Journal, 36*(2), 173-189.

Huberman, A., & Miles, B. (2001). Data management and analysis methods. In C. Conrad, J. Haworth & L. Lattuca (Eds.), *Qualitative Research in Higher Education: Expanding Perspectives* (2nd ed., Vol. Pearson Custome Publishing, pp. 553-571). Boston : MA.

Huberman, A., & Miles, M. (2002). *The qualitative researchers companion*. Thousand Oaks : CA: Sage Publications Inc.

Johnson, R. B. & Onwuegbuzie, A. (2004). Mixed methods research: A research paradigm whose time has come. *Educational Researcher*, *33*(7), 14–26.

Jonassen, D., Howland, J., Moore, J. & Marra, R. (2003). *Learning to solve problems with technology: A constructivist perspective* (2nd ed.). Upper Saddle River, NJ: Merrill Prentice Hall.

Kelly, P. (2006). What is teacher learning? A socio‐cultural perspective. *Oxford Review of Education*, *32*(4), 505–519.

Kwami, R. (2001). Music education in new millenium. In A. Loveless & V. Ellis (Eds.), *ICT, Pedagogy and the Curriculum: Subject to Change* (pp. 216-228). London: Routledge Falmer.

Koopman, C. (1998). Music education: Aesthetic or 'praxial'? *Journal of Aesthetic Education*, *32*(3), 1–17.

Lamont, A. (2002). Musical identities and the school environment. In R. Macdonald, D. Hargreaves & D. Miell (Eds), *Musical Identities* (pp.41-59). Oxford, UK: Oxford University Press.

Lamont, A., Hargreaves, D., Marshall, N. & Tarrant, M. (2003). Young people's music in and out of school. *British Journal of Music Education*, *20*(3), 229–241.

Langer, S. (1942). *Philosophy in a New Key* (3rd ed.). Cambridge, MA: Harvard University Press.

Lave, J. & Wenger, E. (1991). *Situated learning: Legitimate peripheral participation*. Cambridge: Cambridge University Press.

Lebler, D. (2007). Student-as-master? Reflections on a learning innovation in popular music pedagogy. *International Journal of Music Education*, *25*(3).

Leong, S. (2011). Navigating the emerging futures in music education. *Journal of Music, Technology and Education*, *3*(2–3), 233–243.

Lerner, R., Brown, J. & Kier, C. (2005). *Adolescence: Development, diversity, context and applications*. Toronto, CAN: Pearson Education.

Lilliestam, L. (1996). On playing by ear. *Popular Music*, *15*(2), 195–216.

Lincoln, Y. (1994). The fifth moment. In N. Denzin & Y. Lincoln (Eds.), *Handbook of Qualitative Research* (pp. 575-586). Thousand Oaks, CA: Sage.

Lincoln, Y. & Guba, E. (2002). Judging the quality of case study reports. In A. Huberman & M. Miles (Eds), *The qualitative researcher's companion* (pp. 205-215). Thousand Oaks, CA: Sage.

Loveless, A. (1995). *The role of IT: Practical issues for primary teachers*. London, UK: Cassell.

Loveless, A. (2007). Creativity, technology and learning—A review of recent literature. Retrieved 8 October 2007, from http://www.futurelab.org.uk/resources/publications_reports_articles/literature_reviews/Literature_Review382

Loveless, A. & Longman, D. (1998). Information literacy: Innuendo or insight? *Education and Information Technologies*, *3*(1), 27–40.

Loveless, A., DeVoogd, G. & Bohlin, R. (2001). Something old, something new … Is pedagogy affected by ICT? In A. Loveless & V. Ellis (Eds), *ICT, pedagogy and the curriculum—Subject to change* (pp. 63–83). London, UK: Routledge.

McAllester, D. (1967). The substance of things hoped for From *Documentary report of the Tanglewood symposium* MENC 96-99

McPhail, G. (2012). From singular to over-crowded region: Curriculum change in senior secondary school music in New Zealand. *British Journal of Music Education, 29*(3), 317-330.

Mainwaring, J. (1941). The meaning of musicianship: A problem in the teaching of music. *British Journal of Educational Psychology, 11*(3), 205-214.

Mark, M. & Madura, P. (2010). *Music education in your hands*. New York, NY: Routledge.

Martin, A. (2006). Literacies for the digital age. In A. Martin & D. Madigan (Eds), *Digital literacies for learning*. London, UK: Facet.

Martin, A. (2009). Digital literacy for the third age: Sustaining identity in an uncertain world. Retrieved 10 March 2013 from http://www.elearningeuropa.com

McPherson, G. & Gabrielsson, A. (2002). From sound to sign. In R. Parncutt & G. McPherson (Eds), *The science and psychology of music performance* (pp. 99–115). Oxford, UK: Oxford University Press.

Mellers, W. (1969). *Resources of Music: introduction and Score*. Cambridge: Cambridge University Press.

Merriam, S. (1998). *Qualitative research and case study applications in education*. San Francisco, CA: Jossey-Bass Publishers.

Merriam, S. (2001). *Qualitative research and case study application in education*. San Francisco: Jossey-Bass.

Metcalfe, M. (1987). Towards the condition of music: The emergent aesthetic in music education. In P. Abbs (Ed.), *Living powers: The arts in education* (pp. 97–118). London, UK: Routledge.

Miles, M. & Huberman, A. (1994). *Qualitative data analysis: An expanded sourcebook* (2nd ed.). Thousand Oaks, CA: Sage.

Mills, J. & Murray, A. (2000). Good teaching at key stage 3. *British Journal of Music Education*, *17*(2), 129–156.

Ministry of Education (2007). *The New Zealand Curriculum*. Wellington: Learning Media.

Ministry of Education. (2006*). Enabling the 21st century learner: An e-learning action plan for school 2006–2010*. Wellington, NZL: Author.

Moor, J. (2011). News from the principal. *Rangi News March 2011*, 3–4.

Moore, G. (2012). 'Tristan chords and random scores': Exploring undergraduate students' experiences of music in higher education through the lens of Bourdieu. *Music Education Research*, *14*(1), 63–78.

Mortimore, P. (Ed.). (1999). *Understanding Pedagogy and its Impact on Learning*. London: Paul Chapman Publishing Ltd.

Moseley, D., Higgins, S., Bramald, R., & Hardman, F. (1999). Ways forward with ICT: Effective Pedagogy using Information and Communications Technology for Literacy and Numeracy in Primary Schools. Newcastle: University of Newcastle.

Neuman, W. (2003). *Social research methods: Qualitative and quantitative approaches* (5th ed.). Boston, MA: Allyn and Bacon.

Nilsson, B. & Folkestad, G. (2005). Children's practice of computer-based composition. *Music Education Research*, *7*(1), 21–37.

North, A. C., Hargreaves, D. & O'Neill, S. (2000). The importance of music to adolescents. *British Journal of Educational Psychology*, *70*, 255–272.

Nye, D. (2007). *Technology Matters: Questions to Live With*. Cambridge, MA: MIT Press.

Odam, G. (2000). Teaching composing in secondary schools: The creative dream. *British Journal of Music Education*, *17*(2), 109–127.

Odam, G. (2003). Musicianship in the 21st century: Issues, trends and possibilities. In S. Leong (Ed.), *Musicianship in the 21st century: Issues, trends and possibilities*. Sydney, NSW: Australian Music Centre.

Odam, G. (2004). Music education in the aquarian age: A transatlantic perspective. In C. Rodriguez (Ed.), *Bridging the gap: Popular music and music education* (pp. 127–139). Renton, VA: The National Association for Music Education (MENC).

Odam, G. & Patterson, A. (2000). *Composing in the classroom: The creative dream*. High Wycombe, WA: National Association of Music Educators.

Ofsted. (1995). The framework for school inspection (pp. 28). Manchester: Ofsted.

Ofsted. (2009). Making more of music : An evaluation of music in schools 2005/08 (pp. 78). London: Ofsted.

Packer, M. J. & Goicoechea, J. (2000). Sociocultural and constructivist theories of learning: Ontology, not just epistemology. *Educational Psychologist*, *35*(4), 227–241.

Paynter, J., & Aston, P. (1970). *Sound and Silence: Classroom projects in creative music*. London: Cambridge University Press.

Piaget, J.(1932) The moral judgment of the child. London: Routledge & Kegan Paul.

Piaget, J. (1974). *To understand is to invent: The future of education*. New York: Grossman.

Pitts, A. & Kwami, R. (2002). Raising students' performance in music composition through the use of information and communication technology: A survey of secondary schools in England. *British Journal of Music Education*, *19*(1), 61–71.

Plowden, B. (1967). Children and their Primary Schools. London: Central Advisory Council for Education (England).

Prensky, M. (2001). Digital natives, digital immigrants part 1. *On the Horizon*, *9*(5).

Prensky, M. (2005). Listen to the natives. *Educational Leadership*, *63*(4), 8–13.

Prensky, M. (2009). H. Sapiens digital: From digital immigrants and digital natives to digital wisdom. *Innovate*, *5*(3), 9.

Reimer, B. (1970). *A philosophy of music education*. Englewood Cliffs: NJ: Prentice-Hall Inc.

Reimer, B. (1989a). Music education as aesthetic education: Past and present. *Music Educators Journal*, *75*(6), 22–28.

Reimer, B. (1989b). Music education as aesthetic education: Toward the future. *Music Educators Journal*, *75*(7), 28–32.

Reimer, B. (2005). Philosophy in the School Music Program. *Philosophy of Music Education Review, 13*(2), 132 - 135.

Richards, K. (2010). *Life*. London: Weidenfeld & Nicholson.

Roblyer, M. D. (2003). *Integrating educational technology into teaching* (3rd ed.). Columbus, OH: Merrill Prentice Hall.

Rodriguez, C. (2004). Bringing it all back home: The case for popular music in the schools. In C. Rodriguez (Ed.), *Bridging the gap: Popular music and music education* (pp. 3–9). Reston, VA: The National Association for Music Education (MENC).

Roulston, K. (2006). Mapping the possibilities of qualitative research in music education: A primer. *Music Education Research*, *8*(2), 153–173.

Rudolph, T., Richmond, F., Marsh, D., Webster, P., Bauer, W., & Walls, K. (2005). *Technology Strategies for Music Education* (2nd ed.). Wyncote PA: Technology Institute for Music Educators.

Ruthmann, S. (2007). Strategies for supporting music learning through on-line collaborative technologies. In J. Finney & P. Burnard (Eds), *Music education with digital technology* (pp. 131–141). London, UK: Continuum.

Ryan, K., Boulton, M., O'Neill, S., & Sloboda, J. (2000). *Perceived social support and children's participation in music.* Paper presented at the Science, Music & Society: 6th International Conference on Music Perception and Cognition, Newcastle: Staffordshire, Keele University.

Saloman, G. & Perkins, D. (2005). Does technology make us smarter? Intellectual amplifications with, of and through technology. In D. Preiss & R. Sternberg (Eds), *Intelligence and technology* (pp. 71–86). Mahwah, NJ: Lawrence Erlbaum Associates.

Savage, J. (2003). Informal approaches to the development of young people's composition skills. *Music Education Research*, *5*(1), 81.

Savage, J. (2004). Working towards a theory for music technologies in the classroom: how pupils engage with and organise sounds with new technologies. *British Journal of Music Education, 22*(02), 167-180.

Savage, J. (2005a). Information communication technologies as tools for re-imagining music education in the 21st century. *International Journal of Education and the Arts*, *6*(2) 1–11.

Savage, J. (2005b). Working towards a theory for music technologies in the classroom: How pupils engage with and organise sounds with new technologies. *British Journal of Music Education*, *22*(2), 167–180.

Savage, J. (2007). Reconstructing music education through ICT. *Research in Education*, *78*, 65–77.

Savage, J. (2010). A survey of ICT usage across English secondary schools. *Music Education Research*, *12*(1), 89–104.

Savage, J. (2012). Those who can, play; those who can't, use music tech? In C. Philpott & G. Spruce (Eds), *Debates in Music Teaching* (pp.169-184). Hoboken, NJ: Routledge.

Schippers, H. (2006). Tradition, authenticity and context: The case for a dynamic approach. *British Journal of Music Education*, *23*(3), 333–349.

Schon, D. (1987). *Educating the reflective practitioner*. San Francisco, CA: Jossey-Bass.

Schraw, G. & Olafson, L. (2008). Assessing teachers' epistemological and ontological worldviews. In M. S. Khine (Ed.), *Knowing, knowledge and beliefs: Epistemological studies across diverse cultures* (pp. 25–44). Las Vegas, NV: Springer.

Schwandt, T. (2001). *Dictionary of qualitative inquiry* (2nd ed.). Thousand Oaks, CA: Sage.

Seddon, F. A. & O'Neill, S. A. (2003). Creative thinking processes in adolescent computer-based composition: An analysis of strategies adopted and the influence of instrumental music training. *Music Education Research*, *5*(2), 125–137.

Sell, D. (2003). The changing face of music education in New Zealand. *Sound Ideas*, *6*(1), 43–46.

Selwyn, N. (2002). *Telling tales on technology: Qualitative studies of technology and education*. Aldershot, UK: Ashgate.

Selwyn, N. (2011a). *Education and technology: Key issues and debates.* New York, NY: Continuum Publishing Corporation.

Selwyn, N. (2011b). Making sense of young people, education and digital technology: the role of sociological theory. *Oxford Review of Education, 38*(1), 81-96.

Silverman, D. (2003). Analysing talk and text. In L. Denzin & Y. Lincoln (Eds), *Collecting and interpreting qualitative materials* (2nd ed., pp. 340–362). Thousand Oaks, CA: Sage.

Sloboda, J. (1978). The psychology of music reading. *Psychology of Music*, *6*(2), 3–20.

Sloboda, J. (1999). Music—Where cognition and emotion meet. *Psychologist*, *12*(9), 450–450.

Sloboda, J. (2001). Emotion, functionality and the everyday experience of music: Where does music education fit? *Music Education Research*, *3*(2), 243–253.

Smeets, E. & Mooij, T. (2001). Pupil-centred learning, ICT, and teacher behaviour: observations in educational practice. *British Journal of Educational Technology*, *32*(4), 403.

Somekh, B. (2006). New ways of teaching and learning in the digital age: Implications for curriculum studies. In A. Moore (Ed.), *Schooling, society and curriculum* (pp.119-129). London, UK: Routledge.

Somekh, B. (2007). *Pedagogy and learning with ICT*. London, UK: Routledge.

Somekh, B. (2008). Factors affecting teachers' pedagogical adoption of ICT. In J. Voogt & G. Knezek (Eds), *International handbook of information technology in primary and secondary education* (pp. 449–460). New York, NY: Springer.

Somekh, B. & Lewin, C. (2009). Transforming students' learning: How digital technologies could be used to change the social practices in schools. In R. Krumsvik (Ed.), *Leaning in the network society and the digitized school* (pp.1-20). New York, NY: Nova Science.

Southcott, J. & Crawford, C. (2011). The intersections of curriculum development: Music, ICT and Australian music education. *Australasian Journal of Educational Technology*, *27*(1), 122–136.

Spruce, G. (2004). Key principles in teaching music through popular music in the UK. In C. Rodriguez (Ed.), *Bridging the gap: Popular music and music education* (pp.140-151*)*. Reston, VA: The National Association for Music Education (MENC).

Stahl, B. C. (2008). *Information systems: Critical perspectives*. Hoboken, NJ: Routledge.

Stake, R. (1995). *The art of case study research*. Thousand Oaks, CA: Sage.

Stake, R. (2003). Case studies. In N. Denzin & Y. Lincoln (Eds), *Strategies of qualitative inquiry* (2nd ed. pp. 435-454). Thousand Oaks, CA: Sage.

Swanwick, K. (1997). *A basis for music education*. Windsor, UK: National Foundation for Educational Research (NFER).

Swanwick, K. (1999). *Teaching music musically*. London, UK: Routledge.

Swanwick, K. & Cavalieri Franca, C. (1999). Composing, performing and audience-listening as indicators of musical understanding. *British Journal of Music Education*, *16*(01), 5–19.

Tapscott, D. (1998). *Growing up digital: The rise of the net generation*. New York, NY: McGraw-Hill.

Tapscott, D. (1999). Educating the net generation. *Educational Leadership*, *56*(5), 6–11.

Taylor, R. (Ed.). (1980). *The computer in the school: Tutor, tool, tutee*. New York NY: Teachers College Press.

The National Curriculum (2007). United Kingdom: Qualifications & Curriculum Authority.

Thwaites, T. (2008). Music education in a new key: The dissonance of competence, connectedness, culture and curriculum. *New Zealand Journal of Research in Performing Arts and Education: Nga Mahi a Rehia*, *1*(1).

Vakeva, L. (2006). Teaching Popular Music in Finland: What's up, What's ahead. *International Journal of Music Education, 24*(2), 129-134.

Vakeva, L. (2010). Garage band or garageband? Remixing musical futures. *British Journal of Music Education*, *27*(1), 59–70.

Volti, R. (1992). *Society & Technological Change*. New York: St Martin's Press.

von Glaserfeld, E. (1982). An interpretation of Piaget's constructivism. *Revue Internationale de Philosophie*, *36*(4), 612–635.

Vygotsky, L. (1978). Mind and society: The development of higher mental processes. Cambridge, MA: Harvard University Press.

Watt, D. (2007). On becoming a qualitative researcher: The value of reflexivity. *The Qualitative Report*, *12*(1), 82–101.

Way, J. & Webb, C. (2007). A framework for analysing ICT adoption in Australian primary schools. *Australasian Journal of Educational Technology*, *23*(4), 559–582.

Webster, P. (2002a). Computer-based technology and music teaching and learning. In R. Cowell & C. Richardson (Eds), *The new handbook of research on music teaching and learning: A project of the Music Educators National Conference* (pp. 416–439). New York, NY: Oxford University Press.

Webster, P. (2002b). Historical perspectives on technology and music. *Music Educators Journal*, *89*(1), 38–45.

Webster, P. (2007). Computer-based technology and music teaching and learning: 2000–2007. In L. Bresler (Ed.), *International handbook of research in arts education* (pp. 1311–1328). New York, NY: Springer.

Wenger, E. (1998). *Communities of practice: Learning, meaning and identity*. New York, NY: Cambridge University Press.

Westerlund, H. (2006). Garage rock bands: A future model for developing musical expertise? *International Journal of Music Education*, *24*(2), 119–125.

Wiggins, J. (1999). Teacher control and creativity. *Music Educators Journal*, *85*(5), 30–44.

Wiggins, J. (2007). Compositional process in music. In L. Bresler (Ed.), *International handbook of research in arts education* (pp. 453–470). Dordrecht, NED: Springer.

Wise, S. (2010). Teacher and student perceptions of digital technology in secondary school music education: A case study. *E-Journal of Studies in Music Education*, *9*(1), 46–60.

Wise, S., Greenwood, J. & Davis, N. (2011). Teachers' use of digital technology in secondary music education; Perceptions and issues. *British Journal of Music Education*, *28*(2), 117–134.

Witkin, R. (1974). *The intelligence of feeling* (3rd ed.). London, UK: Heinemann Educational.

Woody, R. H. (2007). Popular music in school: Remixing the issues—For it to be authentic, we must teach popular music in a way that is true to the processes of vernacular music making. *Music Educators Journal*, *93*(4), 32–37.

Wright, R. (2002). Music for all? Pupils' perceptions of the GCSE music examination in on South Wales secondary school. *British Journal of Music Education*, *19*(3), 227–241.

Wright, R. (2008). Kicking the habitus: Power, culture and pedagogy in the secondary school music curriculum. *Music Education Research*, *10*(3), 389–402.

Yarbrough, C. (1996). The future of scholarly inquiry in music education: 1996 senior researcher award acceptance address. *Journal of Research in Music Education*, *44*(3), 190–203.

Yin, R. (1994). *Case study research: Design and methods* (2nd ed.). Thousand Oaks. CA: Sage.

Yin, R. (2009). *Case study research* (4th ed.). Thousand Oaks, CA: Sage.

York, N. (2001). Valuing school music: A report on school music. London, UK: University of Westminster and Rockschool.

Zepke, N. (2008). Futures thinking: Raising questions about education in the digital age. *Computers in New Zealand Schools*, *20*(3), 4–12.

Zereson, K. (2012). Partnerships in music education: So—Who is the teacher? In C. Philpott & G. Spruce (Eds), *Debates in music teaching* (pp.211-220). Hoboken, NJ: Routledge.