Using the GarageBand for iOS app to integrate composition tasks within a literacy unit in a generalist year 5 and 6 classroom

A dissertation

submitted in partial fulfilment

of the requirements for the degree of

Masters of Education

at

The University of Waikato

by

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Abstract

This dissertation builds on current thinking and research and reports on a case study that integrates the iPad app GarageBand for iOS within a literacy programme as a means of incorporating music composition into a generalist Year 5–6 classroom.

The key areas of focus were: 1) the students' attitudes towards the range of activities using the GarageBand for iOS app as a composing tool; 2) what guidance was required for the students to frame a response to a multimodal text in musical terms using the app; and 3) what kind of musical response to a multimodal text was generated through the use of the GarageBand for iOS app. To answer these questions, a programme of work was planned and implemented over two terms. Students explored a range of musical elements and developed their aesthetic awareness through a sequential process. This culminated in composing music in pairs to accompany a page from the text *Colour the Stars* by Dawn McMillan (2012). Data were collected through four methods: a questionnaire, a personal reflective journal, a semi-structured interview with a focus group of seven children and analysing students' work. A thematic approach was used to analyse the data. Themes emerging were compared and contrasted with each other.

This study found that by using the loops all of the children within the class were able to compose music that reflected in some way their given colour. Through the compositional process, students explored the musical elements of pitch, dynamics, tempo and timbre and developed in their knowledge of these. Most children were able to adequately justify their choice of the musical elements through the post-intervention questionnaire. Particular guidance provided by the teacher-researcher included direct modelling, setting constraints to the open-ended task through a matrix, providing feedback to the students' compositions, being flexible in the allocation of time, and supporting collaboration between students. Although experimented with, the 'smart instruments' (a feature within GarageBand) proved too difficult to use as the

children lacked the required prior knowledge. The proscriptive nature of the task design allowed the children to demonstrate divergent and convergent thinking, as they approached the task in different ways.

These results indicate that the GarageBand for iOS app can successfully be used within a literacy unit in a Year 5 and 6 classroom to develop knowledge of certain musical elements and encourage aesthetic awareness within beginner composition tasks. It is the researcher's belief that GarageBand has the potential to be an effective tool to counter the insufficient opportunities being offered for composition tasks in many generalist middle and upper primary school classrooms (Barnes, 2001; Bolton, 2008; de Vries, 2011, 2013; McDowall, 2008; Temmerman, 1997).

Keywords: *Primary school, music education, music composition, mobile learning devices, iPad, GarageBand for iOS, integration, literacy*

Acknowledgements

Thank you to my supervisor, Professor Terry Locke, for your passion for music education and guidance along the way.

I am grateful to my parents for always actively supporting my academic endeavours, and to Mum in particular for being ever willing to cast her editing eye over my work.

A special thanks to the children of the study, who were keen and active participants throughout and relished their role as my 'musical guinea pigs'. Also to my school, for allowing me the time to dedicate to this project.

Most importantly, my wonderful husband Ben, for your continual encouragement throughout my studies and loud singing sessions to keep me sane.

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Chapter 1: Introduction

1.1 Purpose

The purpose of this dissertation was to explore the use of the GarageBand for iOS app within an integrated literacy unit to introduce music composition to Year 5 and 6 students. The key areas of focus were:

1) The students' attitudes towards the range of activities using the GarageBand for iOS app as a composing tool,
2) What guidance was required for the students to frame a response to a multimodal text in musical terms using the app, and
3) What kind of musical response to a multimodal text was generated through the use of the GarageBand for iOS app.

The motivation behind the research topic was a desire to include composition tasks with my class, something that felt very difficult to do due to time pressures on my teaching programme with its priority of teaching literacy and numeracy. An integrated unit involving literacy and music, a concept I was familiar with through the cross-disciplinary approach '*Understanding by Design'* (Wiggins & McTighe, 1998) used by my school, seemed to be a practical way forward. My school was also introducing 1:1 iPads for each Year 5 and 6 classroom in the school, which opened up new possibilities for using the technology to encourage music composition. Having had experience with using the GarageBand for iOS app with previous classes, I was aware of its potential and the students' enjoyment in using it. Ultimately, what I hoped to learn from the unit was whether or not this approach could potentially serve as an example for other generalist[1] teachers to use, so that the teaching of composition might be more often included in classrooms.

The unit firstly involved students exploring different texts and identifying the mood being depicted, using musical terminology to explain themselves.

[1] The use of the term 'generalist' refers to teachers who teach the full primary curriculum with one assigned class, rather than teaching 'specialist' music lessons with different classes.

Secondly, students explored how to combine pre-recorded loops/self-recorded loops on GarageBand for iOS app to create complementary harmonies to reflect certain moods. Thirdly, in pairs, students created a musical piece to accompany a page each of the text *Colour the Stars* by Dawn McMillan (2012).

1.2 The research context

The intervention took place in a large, urban primary school in New Zealand with students from Year 1 through to Year 6. The school roll was just over 700 students and consisted of a mix of ethnic backgrounds, consisting of approximately 70% Pakeha, 15% Asian, 12% Maori and 3% from other ethnicities. The children involved in the case study were a typical representation of other 9–11 year olds in decile 10 classrooms, with a range of abilities and learning needs. Students had a wide range of musical knowledge and backgrounds; some students had been learning instruments for several years and taken optional music classes at school, and others had virtually no experience.

Lessons were integrated within a literacy unit as part of my normal classroom programme. This was a move away from how music education was typically provided at the school. The school timetabled one day a week for an 'elective' programme. Children would choose one subject on offer that they were interested in, studying it in depth for one day a week over a term. My unit, with its high music content, would have lent itself well to be part of the electives programme and attracted a clientele of musically minded and educated children. However, I made a deliberate choice to make it part of my general classroom teaching time, to investigate the incorporation of music into the general classroom programme with students who had a range of musical understandings and interests. The unit was conducted on the four non-elective days where other timetabling requirements allowed.

1.3 Significance and key research questions

The issues I wanted to explore in this study included the applicability of using GarageBand with upper primary students with diverse musical backgrounds;

whether GarageBand was an effective tool for involving students in the compositional process, encouraging creativity and developing musical knowledge; some of the practicalities in teaching a music unit using technology; and the musical knowledge required of the teacher (if any) when teaching with GarageBand.

I was interested to ascertain whether GarageBand might be appropriate for use with 9–11 year olds: whether they would enjoy it, their self-belief in their capacity to compose with it and whether they could access all of the related features, such as the 'loops', 'touch-based' and 'smart' instruments.

At Level 3 of the New Zealand curriculum, students are expected to be able to take part in a range of musical activities, including having a solid understanding of the elements of music and expressing and shaping musical ideas, using the elements, instruments and technologies (Ministry of Education, (MOE), 2007). Various researchers espouse the use of loop-based software as a beneficial learning and teaching tool that can engage children in the compositional process (McDowall, 2008; Mellor, 2007; Mills & Murray, 2000; Savage, 2005). This study undertook to test that theory.

Throughout this process I was interested in the specific teaching steps and practicalities involved when teaching a generalist class, with a range of abilities, together with 28 iPads. I also wanted to investigate whether GarageBand might be able to serve as a scaffold for other generalist teachers to teach music and the musical knowledge required (if any) when teaching with GarageBand.

1.4 Outline of the dissertation

This dissertation begins with a literature review. The review includes a discussion of composition within primary schools — the requirements and the reality. Part 2 explores research into mobile devices and loop-based software and research in integrating music and literacy.

In Chapter Four I outline the use of an action research, teacher-based case study methodology that uses mixed methods for gathering data which was adapted for this study. Chapter Five presents a detailed description of the intervention that took place. Chapter Six discusses consequential findings of the intervention and explores some implications of the findings. The final chapter summarises the main ideas from the findings and discusses initiatives for the future**.**

Chapter 2: Literature Review (Part 1)

This chapter reviews the literature related to the teaching of composition in primary schools. It begins by exploring the requirements as set by curricula in various countries, and the role that Information and Communication Technology [ICT] has within this. Section two explores the reality of what is actually happening worldwide in generalist classrooms with regard to composition and identifies several key explanations that account for this.

2.1 Composition in primary schools: The rationale and requirements

Many researchers advocate that music education gives learners opportunities to develop their capacity for original and imaginative expression and develops creativity and divergent thinking (Flockton & Crooks, 2005; Gamble, 1984; Harland et al., 2000; Hickey, 2012). Creativity is defined as a "basic human instinct to make that which is new" (Piirto, 1998, p. 41). It is a valued trait (Hickey, 2012) and a skill actively encouraged in education policies world-wide. In New Zealand, for example, the national curriculum states that students should be encouraged to value "innovation, inquiry and curiosity by thinking critically, creatively and reflectively" (MOE, 2007, p. 10).

While music is essentially a creative discipline in all its aspects, for many educators creativity is most reflected in composition (Barnes, 2001; Carlisle, 2009; Gamble, 1984; Sundin, McPherson & Folkestad, 1998). Composition is defined by Hickey (2012) as "organising music parts into logical, interesting and feelingful form" (p. 7). Burnard and Younker (2002) extend this definition to include the forming or construction of a revised piece over time. The opportunity to revise work in some way before it is considered finished is argued by various researchers as being the key distinction between improvisation and composition (Kratus, 1989; Paynter, 2000; Webster, 1992, cited in Barrett, 1998a). Creative musical thinking in composition involves the ability to think imaginatively (creatively) in sound and manipulate and create new and interesting musical ideas (Hickey, 2012). According to Webster (1987, cited in Kratus, 1989), the creative process alternates between two types of thought: convergent thinking,

the selection of a single, "correct" solution based on the evaluation of known possibilities; and divergent thinking, the generation of ideas or possible solutions. Such divergent thinking does not require one correct solution but the ability to render many possible answers. Problem-solving behaviour has been identified as important to the creative thinking process (Hickey, 2012). Mellor (2008) suggests that 'creative' solutions occur when problems or difficulties are generated by the participants that require new levels of challenge. In this way the composition process is differentiated by the participants' ability to 'open up' increasing levels of experimentation within the composition task itself.

2.1.1 Composition and the curriculum

Composition is included in the music curriculum documents of many countries. In Britain, for example, great efforts have been made to develop the teaching of composition in schools (Paynter, 1997), with the National Curriculum requiring students aged between 5 and 14 engage in music composition (Gall & Breeze, 2005). In Australia, composition and expression form a "vital part of the primary music curriculum" (Reynolds, 2002, p. 16) and children are involved in composing from foundation level upwards (Australian Curriculum, Assessment and Reporting Authority, 2014). In New Zealand every state school is expected to provide programmes in music, dance and drama to all students (MOE, 2007; Shroff, 2006). Children are involved in composing from Level One of the Music-Sound Arts curriculum, as they "explore and express sounds and musical ideas, drawing on personal experience, listening, and imagination" (MOE, 2007, para. 3). The commonality across all the curriculum documents is that children in upper primary school should have quality, ongoing opportunities to develop their composition skills (Bolton, 2006).

The role of composition in music education has been viewed in a variety of ways by researchers and educators, including creative expression (Walker, 1983), a means to introduce children to the music and techniques of contemporary composers (Paynter, 1989; Walker, 1983), a teaching and learning strategy employed to promote musical thinking and understanding (Gamble, 1984; Hickey, 2012; Paynter, 1997), and a craft for the very few musically talented

(Gardner, 1993). Barrett (1998a) believes composition, as a teaching and learning strategy, is the most influential in the music classroom. Increasingly, she states, music educators are "coming to view participation in compositional activities as not only formative of musical understanding, but also as reflective of musical understandings" (Barrett, 1998a, p. 13). In line with this, Hickey (2012) argues music composition at school, particularly in the beginning stages, is best viewed as a process-oriented tool for teaching and nurturing music exploration skills that will enhance musical understanding as well as musical creative thinking. Teaching music composition at this beginning level can provide scaffolding for the eventual skill of crafting a fine music composition.

2.1.2 ICT and composition

Research in the use of ICT in music composition is extensive (Beckstead, 2001; Bolton, 2006, 2008; Chen, 2012; Folkestad, Hargreaves, & Lindstrom, 1998; Gall & Breeze, 2005; Louth, 2013; McDowall, 2008; Mellor, 2007; Mellor, 2008; Reese, 2001; Winters, 2012). ICT embraces all developing and enabling technologies relevant to the curriculum and includes all forms of computer and mobile-based learning (Hodges, 2001). Using ICT as a resource to support composition teaching in music classrooms is today accepted in a number of countries, including USA, UK, New Zealand and Hong Kong (Savage, 2005; Wise, Greenwood & Davis, 2011). Specific reference is made to its use in curriculum statements at primary level, including New Zealand, where achievement objectives for Level 3 state, "Children will express and shape musical ideas, using musical elements, instruments and technologies in response to sources of motivation" (MOE, 2007, Music-Sound Arts, "Developing Ideas", para. 3).

There are a number of benefits argued in favour of teaching composition with technology. Many researchers directly credit the use of technology in raising achievement in composition (Crow, 2006; Pitts & Kwami, 2002; Reynolds, 2005). Technology plays a large role in engaging and empowering students in music composition activities (Bolton, 2008; Rosen, Schmidt & Kim, 2013; Savage, 2005), and is said to make composition more accessible for children (Bolton, 2006; Cain, 2004; Hickey, 1997; Ho, 2004; Louth, 2013; Reese, 2001; Reynolds,

2002). Technology provides musical learning possibilities that go well beyond those previously available, so that children, who up until now did not perceive themselves to be musicians, can handle, create and communicate music using certain technologies (Crow, 2006; McDowall, 2008).

Researchers have begun to explore the use of technology in music education to enhance the development of creativity (Bolton, 2008; Crow, 2006; Demonline, 1999; Hickey, 1997; Mellor, 2008; Nielsen, 2013; Reese, 2001; Rosen et al., 2013). The prevailing view, as summarised by Rosen et al. (2013), is that music technology can "serve as an excellent environment for creative development, offering self-awareness of one's creative process, experiential flow learning and creative thinking skills" (p. 341).

Despite indications in the research literature of pre-secondary children's ability to both use and benefit from using music technology, the use of technology in music education settings is much more common at secondary level (McDowall, 2008).

2.2 Composition in primary schools: Current practice

It is common practice for generalist teachers to be responsible for delivering the arts curriculum to students in the early and middle years in many countries (de Vries, 2011, 2013; Garvis & Pendergast, 2012; Schoff, 2006; Temmerman, 1997). In New Zealand, it is left to individual schools to decide if they employ a music specialist to teach music (Schoff, 2006). In an examination of 109 schools in New Zealand, the New Zealand Education Review Office [ERO] (2004) reported that in 72 per cent of schools at the Year 4 or Year 8 level, the classroom teacher was responsible for the music programme. Over a third of the schools reported that they employed at least one 'specialist' to teach or assist with the teaching of music. A specialist may be a teacher with specific qualifications and training in music or a teacher identified as having particular skills in music. Specialist teachers were more likely to be employed in intermediate, composite or secondary (Year 7 to 13) schools.

2.2.1 Arguments for and against generalist teachers teaching music

The debate as to whether music at primary school level is best taught by music specialists or generalist classroom teachers is long-standing (Hallam et al., 2009). Mills (1991) is in favour of the latter and suggests that just as music should be for all children, it should also be for all teachers. She further views the appointment of a music specialist as contrasting with practice in all other curriculum areas. There, classroom teachers usually teach subjects on the grounds that the advantages of having a teacher who knows you outweigh those of being taught by someone with particular specialist expertise. Mills (1991) concludes all classroom teachers are capable of teaching music, given the appropriate preparation and support. Glover and Ward (1993a) similarly suggest music should be taught by a single classroom teacher and believe all trained teachers possess the ability to teach basic musical skills to all children. They argue the teacher's own skills, as well as their general teaching ability, can be "sufficient to enable children to learn" (p. 17).

Other commentators see the reliance on generalist teachers to deliver specialist curriculum areas as problematic. International research confirms there is a range of factors influencing generalist teachers' ability to deliver music education effectively, including a lack of confidence, motivation and knowledge to deliver the curriculum successfully (Garvis & Pendergast, 2012). Lawson, Plummeridge and Swanwick (1994) express concern that "there may be insufficient teachers in primary schools with the necessary confidence and expertise to implement fully the music programme" (p. 3). Plummeridge (1991) believed that music should be exclusively taught by specialists. He states:

> All music teaching calls for subtle and refined musical judgment. To think that a person can rely entirely on books, materials or instruction manuals to provide the basis of an adequate pedagogy is quite mistaken. Indeed, as Kodaly always insisted, teaching is not only a skilful but also an artistic activity; it depends on the individual being able to transform materials and bring them to life in encounters with children… It is wrong to assume that because generalists (in primary schools) can teach most curriculum

> subjects they can automatically teach music if they have guides and support materials. They may be able 'to cope' and contribute to children's musical education in this way… but if music is to be a truly meaningful and dynamic part of children's education then the foundations of musical understanding must be firmly laid in the early years of schooling. (p. 71)

A third view is the encouragement of the specialist teacher in supporting generalist teachers in the teaching of the full curriculum (de Vries, 2013; Hallam et al., 2009; Garvis & Pendergast, 2012; Holden & Button, 2006).

2.2.2 The reality

While generalist teachers may be able to teach music education, in practice it is not being done consistently. There is evidence of insufficient opportunities being offered in primary schools world-wide for students to engage in composition, especially at upper primary levels (Barnes, 2001; Bolton, 2008; de Vries, 2011, 2013; McDowall, 2008; Temmerman, 1997). In de Vries' (2011) study of 112 first year generalist teachers in Australia, 41 per cent indicated they taught music to their class on a regular basis, and only 8 per cent of the activities were compositional. Of this number there was a much higher proportion of lower primary school teachers teaching music than middle and upper primary teachers. Saunders and Baker (1991) found a similar trend with 159 surveyed elementary school classroom teachers in Washington.

The quality of music teaching by generalist primary teachers has been questioned at an international level (de Vries, 2013). A commonality in generalist classrooms is that when music is taught, it is often used as an 'add-on' to other curricular activities and focuses on preparation for items for school assemblies and concerts, rather than being taught for its own intrinsic aesthetic value or for skill development (Bresler, 1994; Byo, 1999; Giles & Frego, 2004; Saunders & Baker, 1991; Wiggins & Wiggins, 2008). The ERO (2004) report into the quality of music education in New Zealand primary schools classed only 65 per cent of the 109 schools examined as 'effective' or 'highly effective' in implementing the curriculum and learning goals of their music programmes.

Another 20 per cent of schools were 'sometimes effective' and 15 per cent of schools were 'not effective'. A considerable variation was found in the amount of time spent teaching music, ranging from over an hour each week to virtually nothing.

2.2.3 Issues around the teaching of composition: Lack of confidence

Generalist teacher lack of confidence is cited as being one of the main reasons for the dearth of music composition teaching in classrooms (Barnes, 2001; Bresler, 1994; Byo, 1999; Garvis & Pendergast, 2012; Giles & Frego, 2004; Hash, 2010; Temmerman, 1997; Young, 2001). Barry (1992, cited in Byo, 1999) found a teacher lacking confidence in his or her ability to effectively teach music will not provide students with the same number and quality of musical experiences as will a teacher exhibiting greater confidence.

This lack of confidence can be credited, at least in part, to the lack of training received in initial teacher education, a fact conceded by Glover and Ward (1993a), despite their support for generalists teaching music. The literature focusing on the pre-and in-service education generalists receive consistently describes it as minimal (Barnes, 2001; Byo, 1999; de Vries, 2011; Hallam et al., 2009; Russell-Bowie, 2009; Stunell, 2010; Temmerman, 1997), typically consisting of a one-semester course. In comparison, certified music specialists have spent a minimum of four years training (Byo, 1999). There is evidence of a decline in music and other arts provision within teacher education programmes. For example, the 40 training providers in England delivering courses in music in 2001 fell to 14 by 2005, with only 2 per cent of primary training places offering some specialist music education (Stunell, 2010). Stunell (2010) comments that while all teaching students are required to spend periods on school-based teaching placements, it is possible for them not to experience curricular music during these periods. The Royal Society of Arts (cited in Barnes, 2001) found in 1998 that 70% of primary teaching training students from two universities taught music in their second training practice and 60% in their third and final practice. Rogers (1998, cited in Stunell, 2010) believed the figures to be more likely 30–40% of students teaching music during their placements.

In studies of pre-service and practising teachers**,** there is a widely held belief that more time should be devoted to music in teacher education courses (de Vries, 2011; Hallam et al., 2009; Holden & Button, 2006; Russell-Bowie, 2009; Saunders & Baker, 1991). This is important as a study conducted in Australia found the level of initial teacher training to be the strongest determinant of the level of music education generalists provide (Temmerman, 1997). Research on teacher effectiveness shows a strong relationship between teacher subject matter expertise and student achievement, noting that a teacher's level of subject matter competence is the prime predictor of student learning (Cassidy, 1990).

2.2.4 Issues around the teaching of composition: Lack of time

A lack of time in the primary school programme is another reason found consistently in the literature for the lack of music education provided by generalist teachers (Barnes, 2001; Byo, 1999; Bresler, 1994; de Vries, 2011; Giles & Frego, 2004; Hash, 2010; Temmerman, 1997). Music holds a low priority in the education of many western countries, with literacy and numeracy having the dominant focus (Bresler, 1995; Livermore, 2003; Russell-Bowie, 2009; Temmerman, 1997). In New Zealand, achievement in primary schools is regulated by 'National Standards', which measure students against expectations in reading, writing and mathematics in the first eight years at school (MOE, 2015). This information is shared publicly and is increasingly being cited by the Government as an accurate reflection of a school's effectiveness**.** Research indicates that as pressures mount in the high-stakes, externally assessed subjects of numeracy and literacy, music is often the first subject to be abandoned (Stunell, 2010). Bresler (1994) noted through her three-year ethnographic study into music instruction by generalist teachers that they often reported feeling pressure from principals, superintendents and fellow teachers to focus only on 'academic' subjects.

2.2.5 Consequences of a failure to focus on composition

The primary school years have been shown to be significant in the development of lifelong attitudes to music (Asmus, 1986; Barnes, 2001; Temmerman, 1993, 1997). A strong influence on future interest and participation in music is the

lesson content, presentation and coverage of certain activities, as well as teacher knowledge of the subject level (Termmerman, 1997). Barnes (2001) comments:

> The lack of music-making opportunities is particularly serious for primary education since it now looks probable that attitudes to many key aspects of life are set in most of us by the time we are 12. If we have not won children's hearts for music by the end of the primary school, there is very little chance of changing in secondary school. (p. 99)

Barnes (2001) argues for a renewed vision of teacher education, both in initial teacher training and in-service courses, of the value of music. Bringing back musical creativity, he believes, requires musically confident generalists who are aware of current research on the impact of music on learning, thinking and feeling and also have some understanding of the musical 'elements'. Teachers need to be personally convinced of the belief that music making is for all and to know that they have the ability to make music themselves.

2.3 Addressing issues of confidence and time

Generalist teachers' lack of confidence in teaching music and a more general lack of time are two problems that need to be addressed. There is a need for a tool to support teachers in incorporating music composition, which has obvious benefits for students' music learning in their classrooms. This will be explored in relation to the relevant literature in Chapter Three.

Chapter 3: Literature Review (Part 2)

This chapter reviews the literature related to the two issues identified in Chapter Two, by exploring the use of loop-based software as a tool for generalist teachers to introduce composition.

3.1 ICT: 'Transforming' music education?

Running parallel to the issues facing music education and composition is the increasing prominence given to ICT resourcing in New Zealand primary schools (MOE, 2014). Greater resourcing and increasing awareness of the benefits of ICT presents potential for the development of more composition opportunities at primary level (Bolton, 2006).

The outcome of using technology in the classroom is described as being either 'amplicative' or 'transformative' (Kiesler, 1992). An amplicative outcome is where a technology is used to do traditional tasks better or more efficiently. An example of this in the music classroom is the use of midi-synthesizers to notate compositions rather than requiring pen and paper for the same task (Beckstead, 2001). A transformative impact, however, describes a qualitative change in how people think, act and react (Kiesler, 1992). Savage (2005) argues for the transformative use of technology in the music classroom, stating that educators' primary focus should be on:

> Seeking creative approaches to the use of ICT in music education that develop musical dimensions within the curriculum in ways that would be impossible without the technology. By using carefully chosen technologies within the music curriculum in this way, pupils' musical experiences can be more challenging, varied and educationally richer than those possible within a music curriculum devoid of ICT. (p. 179)

There is still a long way to go for this to happen in music classrooms. Hennessy, Ruthven and Brindley (2005) believe much of the rhetoric in the literature about technology revolutionising teaching or teachers 'fundamentally' changing their

lesson plans indicates that while there may be some evidence of 'reshuffling the pack of cards', there is in fact little evidence of anybody actually trying something completely different. Much of the research on teachers' use of ICT in their teaching describes a low level of usage and minimal pedagogical change (Wise et al., 2011). Wise et al. (2011) believe a particular challenge that technology presents to music teachers 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" (p. 118). Many primary teachers find it difficult to develop coherent approaches to musical creativity in generalist music education and have not yet grasped the role new technology might play in developing authentic and relevant ways to do so (Crow, 2006; Mills & Murray, 2000).

3.1.1 Mobile-learning devices

In relation to mobile-learning devices, there have been growing calls to build upon children's out-of-school interactions with digital tools, digital music composition and production within an educational context (Lynch & Redpath, 2012; Wise et al., 2011). Using devices such as the iPad has become the new trend in education. In Siegle's (2013) view, four key features account for much of the popularity of mobile-learning devices. First, they are economically priced compared with laptops, with prices ranging from one-fifth to one-half the price of a traditional laptop. A second advantage is the number of low-cost apps (applications); at the time of Siegle's article, the Apple iPad had more than 275,000 apps. Most apps are priced in the US$5 to US$10 range and many are free. Thirdly, young people are instinctively drawn to the intuitive touch design of pad technology. Finally, pads are light and portable. The iPad weighs less than one kilo, and the sleek, slim design is easy for small hands to manage and transport.

Mobile devices are celebrated as having the potential to offer up new possibilities in education. Their use is said to facilitate the achievement of curriculum requirements, significantly transform access to and use of technology inside the classroom and bring about significant changes in the way teachers approach their professional role as educators (Burden, Hopkins, Male, Martin &

Trala, 2012). There have been research studies into the use of handheld devices in a range of subjects, including reading, mathematics, social studies and science (Banister, 2010). However, research into the use of iPads within music education is still in its infancy (Nielsen, 2013).

Every day more music-related apps are available for both the Android and the iOS market. In this regard, Ruismäki, Juvonen and Lehtonen (2013) believe music apps have dramatic implications for music practice. Music apps roughly fall into four categories: 1) music education tools providing chord charts, scores, fake books, training programs, and lessons; 2) music toys and games providing a "musicky" experience; 3) music tools providing instrument tuning, as well as recording and editing platforms; and 4) virtual musical instruments. Some apps provide tools allowing all four of the aforementioned uses (Gouzouasis & Bakan, 2011). Loop-based software, one of the newest advances in composition software, incorporates all four uses.

3.2 A 'transformative' tool: Loop-based technology

Loop-based software has the potential to influence the missing element of composition in primary school classrooms and be a transformative tool. The software imitates approaches to music-making by DJs and hip-hop artists, by providing creative tools for mixing rhythmic sound samples (Hickey, 2012). The tools offer a range of musical choices, which are drawn from banks of readymade musical materials, or 'loops'. These can be controlled in a variety of ways, by mixing the digital files and adding layers of rhythmic tracks and bass tracks to create completely new compositions (Crow, 2006; Hickey, 2012). Examples of such software include GarageBand (released by Apple for the Mac and iPad), Super Duper Music Looper by Sony, and Dance eJay. For the purposes of this study, GarageBand for iOS was chosen as the focal software.

3.2.1 GarageBand for iOS

The GarageBand for iOS app is described as a "game changer" and a "killer music app" (Gouzouasis & Bakan, 2011, p. 6). In GarageBand students are able to explore a range of musical functions in a variety of ways. Firstly, students can

explore the timbre of different instruments by choosing from the ready-made loops. These are accessed from the instrumental and stylistic catalogues, which allow students to hear the instruments in a specific genre, for example, jazz, pop, and Southern rock (Crow, 2006).

Secondly, students can explore and learn how to 'play' a range of instruments. The computer-based version of GarageBand, while primarily making use of loops, provides the possibility of learning to play piano and guitar. With specially designed content and performance feedback, users can play directly to the computer microphone or through a USB connection. The mobile application of GarageBand extends the musical possibilities of the desktop version by incorporating touch-based instruments and smart instruments. On touch instruments, the student can actually 'play' the sampled instruments, including keyboards (piano, organs and synthesizers), guitars (acoustic and electronic) and drums ('real' and 'electronic'). These can be strummed or hit via the multi-touch interface and offer touch sensitivity, expressive dimensions and a musical feel. For students whose playing skills are not quite as competent, smart instruments are music controllers that help create competent sounding parts of auto-generating grooves and riffs (Ruismäki et al., 2013). They have the options to choose chords, arpeggios, drum patterns, keyboard patterns, music loops and more features (Gouzouasis & Bakan, 2011). What is played on both the touch-based and smart instruments can be recorded and added directly into the composition, alongside any of the recorded loops.

Finally, finished GarageBand compositions can be exported to iTunes or shared wirelessly with someone nearby using AirDrop. They can be shared to the Internet community via social networks, such as YouTube or SoundCloud. A composition can also be saved as a custom ringtone (Apple, 2014). Gouzouasis and Bakan (2011) comment that 'innovative' teachers are currently combining GarageBand compositions with podcasts, blogs and video sharing in music education classrooms, for both performance and assessment purposes.

3.3 The potential of loop-based software

The potential of loop-based software, in particular GarageBand for iOS, includes the development of creativity, the ability to include all children, regardless of ability, in the compositional process, and its ability to scaffold generalist teachers in their teaching of music.

3.3.1 Loop-based technology and composing: A changing understanding

Loop-based software offers a new dynamic to the discussion of creativity and technology because it involves pre-recorded sound bites. A number of questions are raised. Firstly, does using loop-based technologies actually constitute 'composing'? Composition is traditionally associated with the visual manifestation of music in manuscript form, whereas the focus of loop-based composing is based more on the aural components of music structure (Nielsen, 2013). A growing number of educators, however, are calling for a redefinition of the term 'composing' in the light of new music technologies, and an acceptance that the distinctions between terms are more blurred than previously thought (Cain, 2004). Louth (2013) suggests that with regard to loop-based software, the term composing should be understood in a loose, rather than conservative sense, since "what is painstakingly manipulated and put together are often sampled bits of sound, as opposed to musical ideas represented in notational form" (p. 143). Loop-based software provides an excellent process-orientated tool for teaching and nurturing music exploration skills, which Hickey (2012) argues is important for music composition in the early stages. When measured against various definitions of composing, such as Hickey's (2012) statement that composition is simply "organising music parts into logical, interesting and feelingful form" (p. 7) or Barnes' (2001) description of composition (students play with structures, patterns and combinations of sound), it becomes very clear that loop-based software does allow for 'composing'.

A second question is whether loop-based technology does in fact allow students to create something new, raising the question of originality and authenticity when using the software for assessment purposes (Cain, 2004; Winters, 2012). A key concern of music teachers is the extent to which composing with music

technologies is 'original' and/or concerned with re-forming ideas (Winters, 2012). Sefton-Green (2005) goes so far as to question the significance of reworking borrowed material and the influence of the software in determining the creative imagination. He states, "On the whole we don't think of creative work as a series of decisions between pre-given options, yet, to exaggerate, this is the logic of the data-base [loops in loop-based software]" (Sefton-Green, 2005, p. 108). McDowall (2008), however, argues music is not a fixed entity, and it evolves over time in response to various influences, including the available means of production. It is in acknowledging the changing nature of music within culture that arguments, in respect of creativity within loop-based technology, can be addressed afresh. Negus and Pickering (2004) state that:

> The meaning of creativity is integrally tied to changing historical processes, technologies and social conditions, and conceptions of individuals and society. It is precisely because of such connections that the attribution of 'creative' to a social activity or humanly produced artefact necessarily implies a value judgement. (p. vii)

As with any teaching technique, clear objectives and awareness of what to look for within loop-based compositions are essential to their use when teaching composition (Winters, 2012). In discussing the effective use of music technology, Winters' (2012) comments on the importance of classroom practitioners being aware of the processes demanded of the learner by the software packages being used, so that they are clear on what the learning outcomes will be and how these can be effectively assessed.

Another argument against looping software is that it makes it too easy to turn out rapid or thoughtless compositions, without any learning involved (Hickey, 2012). Until recently many of the criteria related to effective musical learning focused on traditional musical performance skills, knowledge and understanding. Hence it can be difficult to evaluate musical engagement and outcomes that bypass performance and result in a range of new expressions (Crow, 2006). The concept of 'creative thinking', rather than 'creativity', sits well

in the discussion of loop-based software, as it focuses on processes rather than polished final products (McDowall, 2008). A new definition and awareness of 'musical learning', through an understanding of how loop-based software can engage students in the compositional process and with creative thinking, can help alleviate the fear that its use will lead to shallow understandings of what composition means.

3.3.2 Loop-based technology and the compositional process

Advances in technology have afforded an easier entry into the recursive nature of the compositional process than traditional pen and paper, through the provision of direct manipulation of sound and immediate feedback to the composer about musical decisions (Reese, 2003). Loop-based software extends these advances by providing "children not only with a dynamic interactive environment but also with a self-reflexive one, within which they can generate, refine and reflect upon their musical ideas" (Mellor, 2007, p. 80).

From the start of composing, pupils must try to judge the success of what they make. Their composing decisions are, therefore, vitally important (Paynter, 2000). Throughout the compositional process using GarageBand for iOS, students can be encouraged to develop their aesthetic thinking and decision-making skills. In an educational context, the aesthetic is described as "thinking intrinsic to an art form" (Barrett, 1998b, p. 59). Barrett (1998b) believes that thinking and decision-making are cognitive in character and primarily concerned with issues of form and structure in an artwork or experience. According to L. Locke and T. Locke (2011), there are three phases in aesthetic knowledge production. Firstly, an awareness of the relationship between events or qualities. Secondly, the emergence or embodiment of this into something durable (a painting, poem or equation) or something enacted (a chant or dance) that exhibits qualities such as balance, shapeliness, harmony and elegance. Thirdly, a response to this formal embodiment, where the maker can take pleasure from his or her own creative arts. In using ICT in compositional tasks, Hodges (2001) believes that it should be seen as "a means to achieve a musical outcome engaging aesthetic responsiveness" (p. 179), rather than seeing it as an end in

itself. Mills and Murray (2000) suggest that an effective use of ICT in music lessons facilitates children with their progress in music by having them work primarily as musicians by composing, listening and appraising.

For most children, composition requires a progressive and scaffolded introduction which leads to a gradual mastery of the skills and discipline of music. This is done through the building blocks of duration, structure, tempo, dynamics, timbre, texture, silence and pitch (Barnes, 2001). One model of the compositional process set out by Savage (2005) involves exploration, selection of sounds, structuring the chosen ideas into a comprehensive whole, and evaluating and revising, which leads a pupil back to any of the previous stages in order to refine their work. Through careful teaching students can be led through this process using loop-based technologies. With repeated experiences, early limited efforts develop into more complex and satisfying pieces as problem-solving and creative thinking increases (Chen, 2012). It is in the context of using the GarageBand for iOS app that the elements of the compositional process will be discussed below.

Exploration

Exploration is the beginning of the creative impulse in music composition and frequently arises from tactile exploration and playing around with ideas (Collins, 1992). Exploratory behaviour is defined as the extent to which sound-blocks are selected "in such a way as not to 'act out' pre-conceived ideas but rather to present musical ideas 'in the making'" (Mellor, 2007, p. 79). The ability of loop-based software to facilitate musical learning through exploration is described as being one of its greatest benefits (McDowall, 2008). GarageBand for iOS is designed so that one can easily perform basic functions but also allow for a more experimental process. The software offers a platform for children to explore the musical elements and a broad palette of sounds with their associated musical functions (McDowall, 2008). Savage (2005) states that such technologies facilitate and enable a closer analysis of, and engagement with, the micro-phenomena of sound. There is a shift of emphasis in compositional inquiry, away from thinking about melody, rhythm or harmony, towards an increasing focus on

dealing with the sound itself and its intrinsic value and place in a wider musical structure. Throughout this process students can assimilate "a 'vocabulary' of music expression, hand-in-hand with their creative imagination" (Savage, 2005, p. 174).

Having a platform for including experimental composition experiences in the classroom provides music-making experiences that involve all students, not just the musically inclined and educated (Walker, 1983). According to Mellor (2007), one of the most significant implications for the application of loop-based software in the primary classroom lies in its inclusivity. GarageBand provides a basic and easy approach for all students, regardless of their musical background, to experience immediate success in this early stage of composition (Neilson, 2013). Through analysing three case studies that employed technology, Savage (2005) reports that giving time and space for playful exploration was vital to the success of the projects. Pupils enjoyed exploring the sounds made using ICT within the context of exploration and discovery, rather than in the context of "right or wrong compositional choices" (p. 171).

Selection of sounds

The selection of sounds is a crucial stage in the compositional process. Once students have had the opportunity to play with and explore sounds, there is the need for a structuring of that play (Savage, 2005). This includes choosing rhythmic structures, instrumental and vocal timbres, and engaging with the musical role and function of instruments, the expressive nature of sound and its placement, repetition and dynamic contrast, form and texture (Crow, 2006). Through the three case studies investigated, Savage (2005) discovered that pupils found the process of selecting sounds relatively straightforward and unproblematic. Being able to listen back to previous work assisted students immensely in choosing what ideas they would use and was an important use of recording technologies in an educational setting (Savage, 2005).

Structure

Structuring is the gathering together of chosen ideas into a comprehensive whole. Within this process there are a number of important considerations, notably the need to manipulate the various elements of the work until some kind of 'relatedness' is achieved. This requires the composer to obtain an overview of the work (Collins, 1992)**.** In GarageBand for iOS, once students have chosen their specific instruments, students use the software to help them to 'think' as they experiment with changes and additions to the initial placements or phrases (Chen, 2012). The loops can be assembled by dragging and dropping them on a grid and can then be repeated, layered, triggered and enhanced with a range of effects and processes (Crow, 2006). Students can also easily alter pitch, duration, tempo, tone colour and volume (Chen, 2012).

Revising

From the initial exploration provided by loop-based software, students can further involve themselves in the compositional process of modifying and revising their work. Webster's (1992, cited in Barrett, 1998a) distinction between improvisation and composition highlights the ability to modify and revise a piece of work in some way before it is considered finished, rather than simply try one new musical idea after another, as in exploratory play. Composing through Garageband for iOS not only helps children generate initial music structures but also helps children refine their work within the compositional process itself. The ability to move beyond the initial selection and positioning of sound-blocks onto the mix in order to work out and expand their ideas shows a certain type of reflexivity (Mellor, 2007).

Some researchers believe that students are naturally inclined to revise their compositions (Bolden, 2009; Kratus, 1989); however, they need help and encouragement in the revision process in order to move forward and develop as composers (Berkley, 2001; Bolden, 2009; Reese, 2003). A teacher can provide this through feedback, which involves the interplay between student and teacher (Younker, 2003). In compositional settings, this involves focusing students on the musical decisions they have made and by pressing them to discover as much

as possible about why they have made the music as it is (Paynter, 2000). Younker (2003) believes this interplay can contribute to the growth of students' understanding of music and of composing and also increase students' understanding of the role feedback plays during the process of composing. Quite often students will view the first attempt at a composition as a finished product and not know what to do with any feedback that may be given. Involving students in the process of dialoguing can increase the probability of their knowing when, why and how to use (or not use) feedback.

3.3.3 Looping software as a scaffold

Looping software can scaffold generalist teachers in teaching and learning situations that would previously have been out of their realm of expertise (McDowall, 2008). McDowall (2008) believes current research demonstrates that music technology, in association with school music curriculum approaches, can help instil confidence in the elements of music in teachers and address the variation of music experience, particularly in listening, composing and performing. This is a result of technology enhancing the opportunities to teach various musical elements in a format different from a performance-based class (Nielsen, 2013*).* Hallam et al. (2009) see the use of technology by generalist teachers for teaching music as a less musically demanding means of increasing confidence to do so.

3.4 Applying the tool

The research into loop-based technology has allowed this researcher to recognise the real possibility of its use for introducing composition to upper primary-aged children. The following chapters report on a case study where GarageBand for iOS was used within a generalist classroom to introduce composition to Year 5 and 6 students.

Chapter 4: The Research Design

4.1 Introduction

This was a case study that used practitioner-instigated action research methodology to investigate a teaching intervention. This chapter discusses the rationale for the chosen methodology and its appropriateness to the research topic.

4.2 Research paradigm

A qualitative research paradigm informs this research study. The main purpose of qualitative inquiry is to understand the subjective world of human experience (Cohen, Manion & Morrison, 2007). The qualitative worldview supports the study of music education in its natural contexts and draws on participants' knowledge and experiences (Bresler, 1996).

Within qualitative research the researcher is always seen as being situated within some value system from which they observe and interpret. The goal of researchers is to become aware of their own subjectivities and values (Bresler, 1996). This research was conducted by a teacher-researcher who was heavily involved in the ongoing investigation and, consequently, was strongly influenced by her own subjectivity.

A range of qualitative methods were adopted for this study to give a better understanding of the context, improve the validity of the data and indicate connections between the information generated by the various modes of data collection. The research questions required participants to share their thoughts, opinions and ideas regarding their experiences of using the GarageBand for iOS app to compose within the classroom. A reflective journal was used throughout the unit by the researcher to record insights gained, any changes made in lessons, and developing ideas concerning the research objectives. The study also took into account the students' final compositions, which were measured against set criteria. This inclusion of a quantitative element still allows it to fit within the qualitative research method of action research, which gathers both quantitative

and qualitative data to address improvements in an educational setting (Creswell, 2012).

4.3 Methodologies

4.3.1 Case study

The case study method is widely used in contemporary educational research (Cohen et al., 2007; Gall, Gall & Borg, 2007). It is an in-depth exploration of a bounded system in an authentic context (Creswell, 2012). Case studies "focus on one (or just a few) instances of a particular phenomenon with a view to providing an in-depth account of events, relationships, experiences or processes occurring in that particular instance" (Denscombe, 2010, p. 52).

The 'case' forming the basis of the investigation is normally something that already exists and not a situation that is generated specifically for the purposes of the research (Denscombe, 2010). The students involved were part of my current class. The thematic unit developed in this case study was in keeping with the cross-disciplinary approach *'Understanding by Design'* (Wiggins & McTighe, 1998) practised by the school. The children were already familiar with using iPads within their class programme owing to the school's strong background and application of using iPads.

4.3.2 Action research

Action research addresses a specific, practical issue and seeks to obtain solutions to a problem (Cresswell, 2012). It frequently involves carrying out an 'intervention' and assessing its effects in order to refine future action (Menter, Elliot, Hulme, Lewin & Lowden 2011).

Action research requires the systematic collection of data as the interventions are enacted (Burns, 2005; Gall et al., 2007), which can be either quantitative, qualitative, or both (Cresswell, 2012). This is followed by an analysis of the data and reflection on the implications of the findings for a further cycle of observation and action (Burns, 2005).

The process of action research is characterised by a spiral of cycles involving planning, acting, observing and reflecting, which are applied interactively according to the social and political context of the research environment and the personal and professional backgrounds of the researchers (Burns, 2005).

4.3.3 Practitioner research

'Practitioner research' is a common mode of action research. The person undertaking the research is both researching and practising and very often are 'teacher-researchers'. Practitioner research is usually undertaken within the practitioner's own practice, as in the case of this study. However, it can also include a group of teacher-researchers working together (Menter et al., 2011).

This case study used a teacher-based action research methodology to investigate a teaching intervention designed by the teacher. The research was conducted by a teacher-researcher wanting to effect change within her practice by exploring a practical means of including composition within her teaching programme. The teacher-researcher used a practitioner inquiry action research model that included both qualitative and quantitative methods of data collection in an effort to gain a holistic picture of the situation being researched.

4.4 Data collection

4.4.1 Questionnaire

A questionnaire was used at the start and the end of the case study with the aim of identifying students' attitudes and musical understanding and any potential shifts. Questionnaires are a useful tool for studying attitudes and can be used to collect data in a relatively short period of time (Menter et al., 2011). In order to answer research question 1, it was necessary to gather children's initial attitudes towards composition, the GarageBand app and music education in general. Students answered the paper-based pre-intervention questionnaire individually, with help from the researcher if needed to understand the questions. Research question 3 required gaining children's responses regarding their thoughts about composition subsequent to the intervention, how they found using GarageBand

to compose and their overall attitude towards the process. Students answered the post-intervention questionnaire through Google Forms, accessed via their individual iPads. The data were analysed by coding the responses and looking for themes in the responses.

4.4.2 Reflective journal

Action research emphasises the use of reflection in the research cycle (Gall et al., 2007). Hobson (2001) recommends teacher researchers keep a journal to help them evaluate their experiences and Somekh (2006) states that the research diary or journal can be an essential companion to the process of carrying out action research. Journals are the record of first-hand observations by the teacher-researcher.

At the end of each lesson, I reflected on how the lesson had gone and noted anything of interest – for example, children's responses and comments, changes to the lesson plan. Notes made throughout the intervention also included reflective insights, memos and developing ideas concerning the research objectives. These were then analysed by sorting and categorising the material into the important themes and issues that arose (Menter et al., 2011).

4.4.3 Semi-structured interviews

Interviews are an accessible tool to use with children, as they allow children to answer in their own words and do not limit participants on account of their literacy skills. Semi-structured interviews were specifically chosen, as the nature of the interview is flexible and allows questions to be adapted to suit the responses gained (Appendix A). Also, the interviewer is able to answer questions concerning the purpose of the interview and address any misunderstandings that may arise (Cohen et al., 2007; Menter et al., 2011).

'Focus groups' were chosen as the specific method for interviewing. Focus groups entail selecting a small group of participants to elicit their views, attitudes and experiences related to particular and relevant topics, via moderated discussion. A key feature of this method is the interaction and

discussion among participants (Menter et al., 2011). This method allows children to discuss the questions, help each other with the answers, remind each other about details and keep the answers truthful (Einarsdóttir, 2007). A focus group of seven children were chosen from the class, representing an equal mix of girls and boys, and Year 5 and Year 6s. The students all had prior experience with the GarageBand for iOS application. Three of the students had not taken part in an optional music elective previously, and four had. Students had a range of confidence in composing and in using the GarageBand for iOS app.

4.4.4 Students' work

Examples of students' work can provide an invaluable source of information about students' understanding (Liberty & Miller, 2003). Throughout the unit, students uploaded their finished compositions into a shared Google Drive folder. This enabled me to access their work as they worked through the unit. For the final composition task, students created iMovies using the audio from GarageBand for iOS, a screenshot of the loops frame and the picture their composition was based on from *Colour the Stars* (McMillan, 2012). These final compositions were marked according to the criteria in the co-constructed matrix.

4.5 Analysis of data

Thematic analysis is "a qualitative strategy that takes its categories from the data" (Mutch, 2005, p. 176). It is a method for identifying, analysing and reporting patterns (themes) within data. A theme captures something important about the data in relation to the research question and represents some level of patterned response or meaning within the data set (Braun & Clarke, 2006).

The first stage of thematic analysis in this study was familiarisation with the data (Braun & Clarke, 2006). As the teacher-practitioner, I was immersed in the creative process throughout. I observed their compositions as they were created and gave feedback. I also transcribed the semi-structured interview. The second stage involved generating initial codes from the data to identify "tentative ideas and themes that come through in initial qualitative analysis" (Mutch, 2005, p.

216). Codes categorise features of the data that appear interesting to the analyst (Braun & Clarke, 2006) and refer to "the most basic segment, or element, of the raw data or information that can be assessed in a meaningful way regarding the phenomenon" (Boyatzis, 1998, p. 63). The codes were analysed at a semantic level by identifying the explicit or surface meanings of the data (Boyatzis, 1998). The third stage involved sorting the different codes into potential themes and collating all the relevant coded data extracts within the identified themes (Braun & Clarke, 2006). Four main themes emerged, including the impact of the teacher, task design, peer relationships, and the practicalities of using GarageBand. These themes were then interpreted with an attempt to theorise the significance of the patterns and their broader meanings and implications (Braun & Clarke, 2006).

4.6 Credibility and trustworthiness

Gall et al. (2007) outline validity criteria for evaluating the credibility and trustworthiness of action research studies. These include outcome validity, process validity and dialogic validity.

Outcome validity involves the extent in which actions occur that lead to a resolution of the problem under study or to the completion of a research cycle that results in action (Gall et al., 2007). The research was involved with exploring the task of integrating composition within a literacy unit. All students completed several compositions, all of which they were proud of.

Process validity addresses the adequacy of the processes used in different phases of research, such as the data collection, analysis and interpretation, and whether triangulation of data sources and methods was used to guard against bias (Gall et al., 2007). This research generated data information from four sources; the researcher's reflective journal was triangulated with the voices of participants as reflected in questionnaires and interviews, and with an analysis of student work.

Dialogic validity assesses the degree to which the research promotes a reflexive dialogue among all the participants in the research, and to generate and review

the action research findings and interpretations (Gall et al., 2007). Throughout the unit students were involved in reflecting on how their work was going, either through whole-class discussions, with their peers, or through semi-structured interviews. Throughout the unit the researcher made reflections and adjusted her teaching plan accordingly.

4.7 Ethical considerations

The following sections describe the ethical procedures that were implemented during this study, namely gaining ethical approval, attaining informed consent from the children of the study and their parents, ensuring confidentiality through the use of pseudonyms, ensuring that no harm would come to the children, and acknowledging my role as the teacher and participant-researcher.

4.7.1 Ethical approval

This research project gained approval from, and was conducted under the regulations set by, the University of Waikato School of Education Ethics Committee.

4.7.2 Informed consent

Initially, permission was sought from the school principal and the Board of Trustees for the research to be conducted (Appendix B). Students from the class took home a research information sheet explaining the goals of the research, the procedures involved and the rights of the participants. Such rights included the right to decline participation. It was emphasised that participation was voluntary and unforced. Appended to the information sheet was an informed consent form for parents to read and sign if they agreed to their child's involvement in the study (Appendix C). Students were also given an informed consent form, written in language they could understand (Appendix D). Data were collected only from students who signed themselves and whose parents returned the signed form.

4.7.3 Confidentiality

Every effort has been made to ensure confidentiality through the use of pseudonyms for the students and not mentioning the name of the school.

4.7.4 Harm

No harm to participants was foreseen in conducting this study. Students were all aware that their participation in the study was voluntary. Those students who did not wish to take part were still involved in all the activities, but their data were not collected. The interruption to classroom work was minimal as most data were collected as an integral component of normal classroom activities. The GarageBand app was already installed on all the iPads in the school prior to the unit and was therefore accessible by students. As the app was not linked to the Internet, there was no possibility of students accessing inappropriate content.

4.7.5 My role as teacher and participant researcher

Conflict of interest was minimised by ensuring that students were aware that their work was not being graded. Also, a critical friend conducted the semi-structured interview to address the issue of conflict of interest, where students may have felt they couldn't tell the truth or didn't wish to hurt the feelings of their teacher.

Chapter 5: The Intervention

5.1 Introduction

This chapter discusses the context of the intervention and the lessons constituting the intervention itself. The intervention built on the research discussed in Chapter Two, where participation in compositional activities is seen as being a process-orientated tool for teaching and nurturing music exploration skills (Hickey, 2012), and formative and reflective of musical understanding (Barrett, 1998a). It was designed with the findings of Chapter Three in mind: that students can be creative, engage in the compositional process and develop their aesthetic awareness through the use of loop-based software.

5.2 The class

The intervention class was my generalist Year 5 and 6 class, with students aged 9–11. The 28 students represented the typical make-up of other decile 10 classrooms, with a range of academic ability and learning needs. The ethnic make-up of the class mirrored very closely that of the school, with 71 per cent Pakeha, 14 per cent Maori, 11 per cent Asian and 4 per cent other. Of the 28 students, 27 agreed to be part of the case study, with two being away for the week leading up to the final composition. Students had a range of previous musical experiences, with some having taken private music lessons for several years and those who had very little.

The school in question was well supplied with technology. Every class had an interactive whiteboard, a projector and Apple TV. At the beginning of the unit, the school was implementing 1:1 iPads to the Year 5 and 6 classrooms. This meant that every child in the class had an iPad assigned to them that they were able to access throughout the unit. For storage of finished compositions, students added their work into a folder in Google Drive, which was shared with the teacher-researcher. This allowed access to every child's work. When sharing back to the class, students displayed their work through Apple TV, which allowed the class to listen and see which tracks had been used and where they had been placed.

5.3 Baseline data

A questionnaire (Appendix E) was administered at the outset of the intervention, with the intent of establishing baseline information related to the key questions of this study for later comparison with the post-intervention data. The data gained from the baseline questionnaire were aimed at establishing an indication of the children's attitudes towards composition tasks at school and their previous exposure and confidence with using the GarageBand app.

The following breakdown of the results of the questionnaire highlights the responses students made in relation to the questions.

5.3.1 Experience with composing music using an iPad app

Three students stated they had not previously used an app to compose music with. Twenty-four students had previous experience composing using an iPad app. The most common app was GarageBand for iOS (20). Two students noted that they had used the Tiny Piano app, which has a free play option. Four students stated that they had used the Magic Piano by Smule app. However, this is not a composing app; rather, students touch the screen to 'play' pre-recorded songs.

5.3.2 Confidence at composing music

Table 1. Baseline Data: Confidence at Composing Music

I don't feel confident so I don't do it.	I don't feel confident but will do it with a buddy	Will give composing a go	I feel confident when I work with a buddy	I feel confident composing by myself	I feel totally confident composing by myself
1	3	2	6	7	8

5.4.3 Experience with GarageBand app

Twenty-six of the 27 students said they had used the GarageBand for iOS app before. This was interesting as only 24 students had indicated they had used an app to compose in previous questions in the questionnaire.

Children were then asked where they had used the app. Thirteen students said they had used it at school as part of their classroom work, 23 said they had used it at school during their free time and seven said they had used it at home. Of the 13 children who said they had used GarageBand as part of their classroom work, 4 had been involved in a music elective the term prior to the intervention where GarageBand had been a major component. It is unknown in what capacity the other 9 children had used GarageBand in class.

Students were then asked how confident they felt using the GarageBand app. Twenty-four students indicated they felt some level of confidence and 3 students indicated that they were not very confident.

Table 2. Baseline Data: Confidence at Using the GarageBand App

I don't feel confident	I'm not very confident but will do with it a buddy	I will give it a go	I feel confident when I work with a buddy	I feel confident using GarageBand by myself	I feel totally confident using GarageBand by myself
0	1	2	3	7	14

5.4 The Intervention

The intervention was separated into two parts that took place over two terms: four weeks in Term 2 and six weeks in Term 3. Owing to a range of factors (curriculum pressures, a student teacher who needed to teach her own lessons, public holidays, school trips, assessment requirements and researcher illness), the number of lessons varied; sometimes there were 3 lessons per week, other weeks there were none. Lessons during Term 2 were half-hour blocks during the week that introduced the musical elements of pitch, dynamics, tempo and timbre and the features of the GarageBand app. The exploration work around GarageBand was done individually, but with a lot of collaboration between pairs and sharing back work to the class. Lessons in Term 3 were focused on students identifying the moods present within musical pieces and the moods of different texts, and composing their own music to depict a particular mood. The tasks

were designed with an open-ended approach and were completed in pairs. (See Intervention Overview: Appendix F).

Lessons were designed with specific intentions in mind, in keeping with Burnard's (1995) structure: 'practise tasks' that aimed to renew, regenerate and consolidate knowledge, 'formative tasks' that aimed to transmit and apply new knowledge and 'composition tasks' that aimed to promote artistic activity, and where individuality and unpredictable outcomes were valued.

5.4.1 GarageBand for iOS app

A free version of GarageBand for iOS had recently been released by Apple to all newly bought iPads, which made its use all the more practicable for the intervention. Unfortunately, a week prior to starting the unit, I discovered that the free version did not allow access to all the features of the paid version; the range of smart instruments available was limited to only the guitar. Not having access to the smart violins was a particular loss, in the researcher's view, due to their impact in creating a mood.

5.4.2 Specific learning outcomes [SLOs]

In keeping with the 'co-equal cognitive' integration style, music was given equal priority with the literacy goals of the unit (Bresler, 1995). The SLOs were chosen in accordance with Level 3 of the New Zealand Curriculum. Within all four of the arts disciplines, the objectives are structured around four interrelated strands: Understanding the Arts in Context [AC], Developing Practical Knowledge in the Arts [PK], Developing Ideas in the Arts [DI], and Communicating and Interpreting in the Arts [CI] (MOE, 2007).

The SLOs were that students would:

1. Become familiar with the different features of the GarageBand app on iPad (including incorporating a range of pre-recorded loops, different instruments, structure).
2. Be able to describe and identify the different musical elements: beat, rhythm, pitch, tempo, dynamics and tone colour (PK).

3. Understand that music can be structured (PK).
4. Understand that music can depict moods through the specific use of the musical elements (PK).
5. Understand that music is used to support the storylines of texts and movies (AC).
6. Identify the mood of a composition and specify the musical elements used (PK).
7. Identify the mood described in a text, applying knowledge of the elements of music to justify (PK).
8. Express and shape musical ideas to show a particular mood using GarageBand (DI).
9. Create a matrix to specify what makes an effective composition on GarageBand (CI).
10. Respond to their peers' compositions in relation to matrix (CI).
11. Reflect on own compositions in relation to matrix (CI).

5.4.3 Learning activities

A range of learning activities were planned to support the students in successfully meeting the learning objectives.

Become familiar with the different features of the GarageBand app on iPad

All major features of the app were introduced through whole class modelling. Apple TV was used to project the teacher's iPad onto the whiteboard and the individual steps or procedures explained (e.g., how to add a loop). Students would then be given time to apply the skills themselves. As students became more confident using the basics, more complex features of GarageBand were explored. These were identified either by me (e.g., how to extend the number of 'bars') or features found by the children that they wished to learn more about. One example was the 'Jam Session', which allows students on other iPads nearby to 'join' a session and compose together, with the tracks appearing on both iPads.

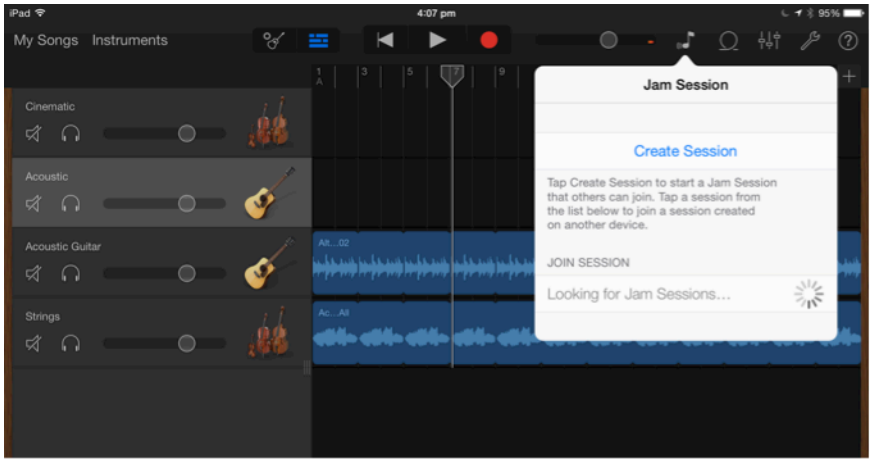


Figure 1. Example of the 'Jam Session' button (Source GarageBand for iOS app).

Be able to describe and identify the different musical elements: beat, rhythm, pitch, tempo, dynamics, and tone colour

An emphasis throughout the intervention was on building the students' musical vocabulary. After an introduction to the musical terms, the students created actions to help support their understanding: tempo (running fast then running slow), pitch (big movements up and then down) and dynamics (hands out wide 'singing' loudly, then in). At the start of most subsequent lessons, we began by recapping the musical elements and their functions, using the hand actions. The elements of music were explored and discussed throughout the intervention, either in relation to what they could hear or through the act of composing itself. Often, the elements were addressed through discoveries or challenges experienced by the children. For example, it became evident that some tracks had a 'louder sound' than others. We had a discussion about the need to hear every instrument in a piece of music and how the timbre of the instruments affect this.

Understand that music can be structured

This was acknowledged in various ways throughout the unit. Students were introduced to the idea that music tends to have a beginning, middle and an end. They learnt about the "mathematics of music", how music often works in lots of 2s, 4s or 8s. Students were encouraged to add loops every second, fourth or eighth bar and to change chords in the smart instruments on even bars. We also discussed that when using chords, a piece of music feels well-rounded

structurally when it starts and ends on the same chord. Students explored the different chords on smart guitar and then chose one to start and end on. They then had to choose two more chords to play between the beginning and the end, and then 'count out' two bars to play each chord.

Identify the mood of a composition and specify the musical elements used
While listening to specific pieces of music or video clips, students were asked to identify the musical elements and how these were used to support the mood. The focus of several lessons during Week 3 in Term 3 was on listening to different classical pieces (see Appendix F, resources) and identifying the general mood of the pieces. This was extended into work in small groups, where students identified the dynamics, the pitch, the tempo and the instruments in the piece and how these was used to reflect the mood.

Understand that music is used to support the storylines of texts and movies
Students watched a variety of different video clips throughout the intervention. For example, in Week 9, Term 2 we watched the YouTube clip *How Music Can Change a Film*, which had a scene from the *Pirates of the Caribbean* movie repeated with four different types of music: triumphant and victorious, scary and foreboding, comical, sad and thoughtful. We discussed the impact the different music had on how we interpreted the scene and the musical elements used to convey the particular moods.

Understand that music can depict moods through the specific use of the musical elements
Once students were familiar with the musical elements and the concept of 'mood' through exposure and discussion around existing compositions, we brainstormed a list of different moods that we felt could be shown in music. Alongside these, students identified the musical elements that might accompany each mood. For example, the dynamics of spooky music were "soft, with random loud bits" and sad/lonely music was "soft or really soft". Instruments were listed that might help reflect a mood. For example, it was decided that mad/angry

music had lots of drums and electric guitar. This was displayed around the classroom for future reference.

Identify the mood described in a text, applying knowledge of the elements of music to justify

When reading a text, students engaged in discussions about what they felt the mood was and how this would be reflected through the musical elements of pitch, dynamics and tempo. Key words and phrases were highlighted (and their meanings discussed where necessary) and the feelings that arose from them. Students would then discuss what instruments might be useful and the specific elements of music needed to create the particular mood.

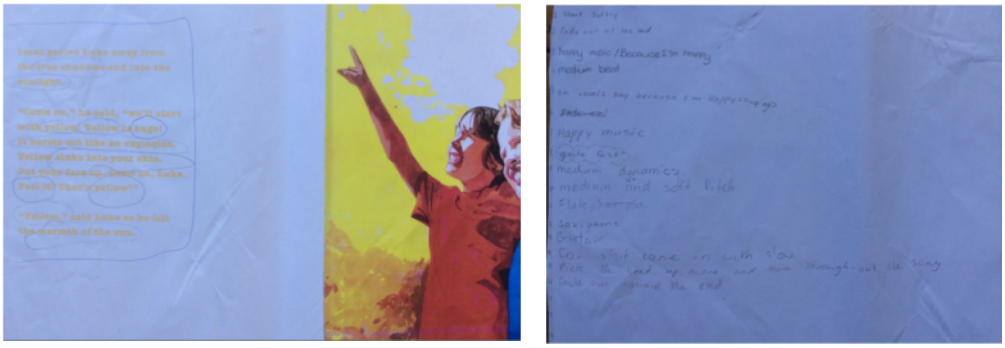


Figure 2. Sophie, Ruby and Lydia's brainstorm, adapted from page 5 from *Colour the Stars* by D. McMillan, 2012, Auckland, New Zealand: Scholastic New Zealand Ltd. Reprinted with permission.

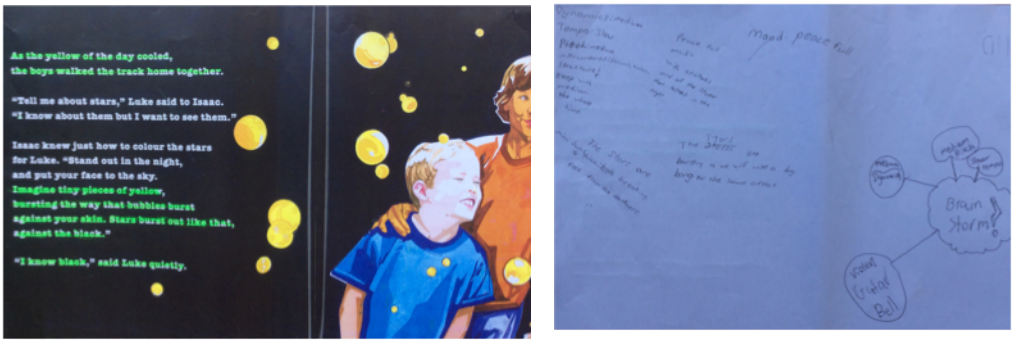


Figure 3. Micah and Jasper's brainstorm, adapted from page 17 from *Colour the Stars* by D. McMillan, 2012, Auckland, New Zealand: Scholastic New Zealand Ltd. Reprinted with permission.

Express and shape musical ideas to show a particular mood, using GarageBand

Initially, students were given a specific mood for composing. In the first week of the intervention this was to create a 'happy' piece of music. Later in Term 1,

students chose a theme observed in the *How Music Can Change a Film* clip and tried to create their own version. The final set mood was to compose a 'sad' piece of music.

Later in Term 3, students identified their own moods as shown through a text and were asked to compose music that reflected it and would support the text. Following a shared book lesson on *Where the Wild Things Are* (Sendak, 1975), the class discussed where they might be able to add music to support the storyline. They chose the page where the forest grows around Max. Most students took the approach of creating music that modelled the forest growing. Several students did this by playing ascending notes on the touch-based keyboard and using the 'Arpeggiator' button, which automatically plays notes in sequence.

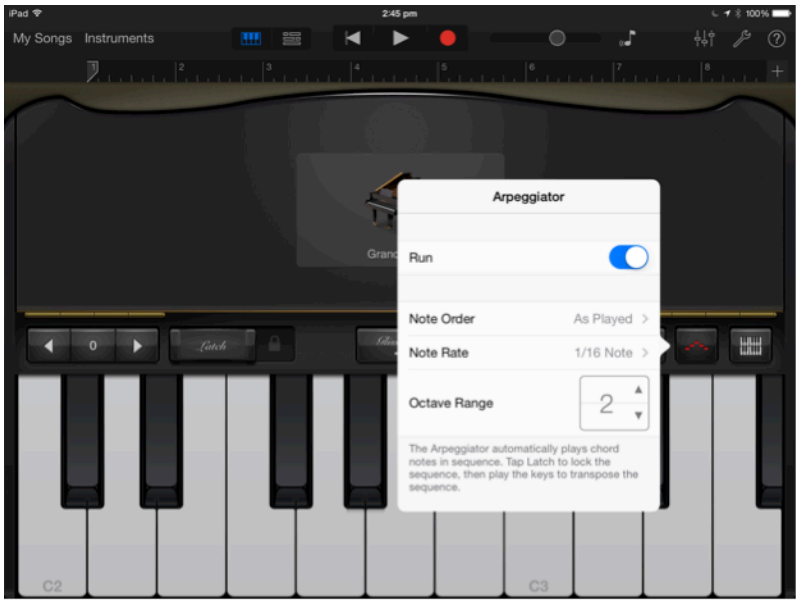


Figure 4. Example of 'Arpeggiator' function in keyboard (Source GarageBand for iOS app).

Students were assigned a particular theme that had been identified within *The Forgotten Garden* (Repchuk, 1997) and composed music in pairs that represented that. Compositions were shared back with the text read over top. A lively discussion followed after the compositions for each section had been played, where students analysed which compositions they felt best matched the mood and why.

The final composition task was for students to identify what mood they felt was represented by a colour (as shown through the text and the illustration) in the book *Colour the Stars* (McMillan, 2012). The first task was conducted by the whole class, which was to compose music that reflected the 'calm' of the first page. On the following day students were assigned their own colour from other parts of the book. Once they had planned their composition, the instrument choices, elements of music they would try to include and the structure, students had three days to compose. Students met with me throughout the process, initially to discuss their brainstorm and how they were going to show the mood, then, where needed, while composing.

Create a matrix to specify what makes an effective composition on GarageBand
In the lead up to creating a matrix, students were given particular criteria for composing. For example, the criterion for the first 'happy' composition was that it showcase the particular skills students had on GarageBand so far. When composing a mood based on the *Pirates of the Caribbean* YouTube clip, the criteria were that students must have at least four different tracks, including a range of percussion and melodic instruments, and that their composition must match the mood they chose. In Week 4 of Term 3 students created a 'sad' piece of music where the focus was on ensuring that the loops matched together, with one strong melody line and the rest of the instruments supporting this. The criteria were also that students had four tracks that matched the style of music, which included some percussion and other melodic instruments. The students needed to ensure that the tracks complemented one another and that the tempo and dynamics matched the mood.

In Week 5 of Term 3 the class co-constructed a matrix to combine all of the features we felt made an effective composition on GarageBand, from 'still learning' to 'sounds amazing'. Through a whole class discussion, students discussed the key elements within each of the set criteria (e.g., instrument choice, tempo, dynamics). The matrix was written in kid speak.

Table 3. First Co-Constructed Matrix of GarageBand Compositions

GarageBand – First draft

	Still learning	Sounds good	Sounds amazing
Number of Instrument tracks	Less than 4	4 or more instrument tracks	4 or more instrument tracks
Instrument choice	Instruments don't match the type of music No percussion track (drums, congos, tambourine)	Instruments match the type of music At least one percussion track (drums, congos, tambourine)	The instruments match the type of music really well At least one percussion track
How it sounds together	- Doesn't match together - The sounds clash - No melody/too many instruments taking the melody	- All the sounds match together, like a family - The sounds don't clash - Melody by one instrument	- All the sounds match together, like a family - The sounds don't clash - Strong melody by one instrument, supported by other sounds.
Tempo	The wrong tempo for the style (too fast, too slow)	Fits the style of music	Fits the style of music perfectly
Dynamics	Doesn't fit the style of music (too loud or too soft) OR random louds and quiets	Fits the style of music (sad – quiet, angry – loud)	Fits the style of music (sad – quiet, angry – loud)
Overall mood	Style of music is unclear	Has a clear mood of the song	Very clear mood of the song

This was later developed to a more extensive matrix which incorporated all of the subsequent lessons where relevant discussion occurred. This matrix was used for the students to refer to as they composed and for the teacher-researcher to mark students' compositions at the end of the intervention.

Table 4. Final Co-Constructed Matrix of GarageBand Compositions

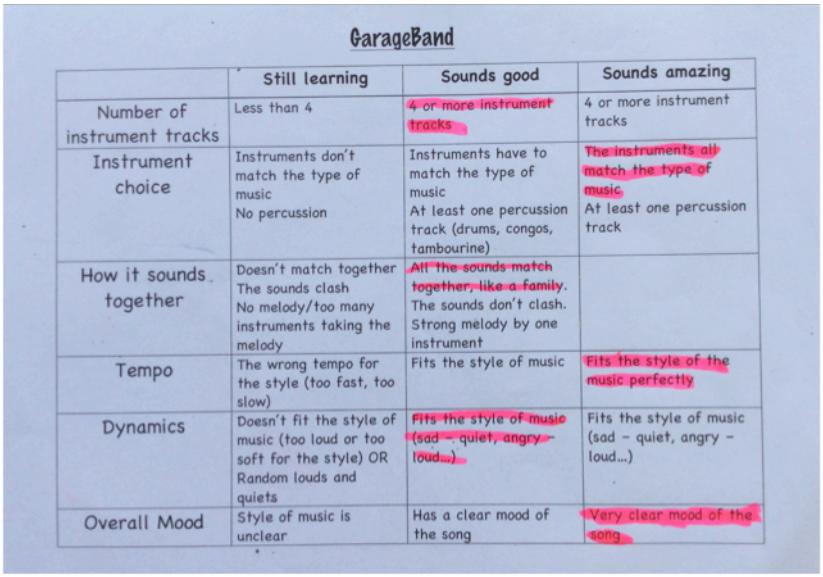
GarageBand Group: _____

	Still learning	Sounds good	Sounds amazing
Instrument tracks	Less than 4	4 or more instrument tracks	4 or more instrument tracks
Instrument choice	Instruments don't match the type of music No percussion (drums, congos, bongos). - You can't hear some tracks	Instruments match the type of music At least one percussion track - You can hear all the tracks	The instruments match the type of music really well At least one percussion track - You can hear all the tracks
Smart instruments	Random chords used	Music makes sense, chord changes aren't random. (For each 8 bars, up to 4 changes)	Music makes sense, chord changes aren't random (For each 8 bars, up to 4 changes)
Where tracks are added	Tracks are added in the middle of the bar	Tracks are added in a musical sense – every 2, 4 or 8 bars.	Tracks are added in a musical sense – every 2, 4 or 8 bars.
How it sounds together	- Doesn't match together - The sounds clash - No melody/too many instruments taking the melody	- All the sounds match together, like a family - The sounds don't clash - Melody by one instrument	- All the sounds match together, like a family - The sounds don't clash - Strong melody by one instrument, supported by other sounds.
Tempo	The wrong tempo for the style (too fast, too slow)	Fits the style of music	Fits the style of music perfectly
Dynamics	Doesn't fit the style of music (too loud or too soft) OR random louds and quiets	Fits the style of music (sad – quiet, angry – loud)	Fits the style of music (sad – quiet, angry – loud)
Structure	No clear structure Song finishes suddenly	A clear beginning, middle and end to the song	A very clear beginning, middle and end to the song
Overall mood	Style of music is unclear	Has a clear mood of the song	Very clear mood of the song

Respond to their peers' compositions in relation to matrix

Throughout the unit students shared their compositions with the class. This was initially done in relation to the set criteria and then related to the matrix. Students were always very enthusiastic about sharing their pieces. If time was pressing, students would share with a partner.

Once the matrix was designed, students made a copy and peer-reviewed a buddy's composition according to how they felt it matched the different columns. They then discussed their evaluations with their peer. Students were generally fairly honest with each other, although the distinction between 'sounds good' and 'sounds amazing' was often rather difficult to decipher.



GarageBand

	Still learning	Sounds good	Sounds amazing
Number of instrument tracks	Less than 4	4 or more instrument tracks	4 or more instrument tracks
Instrument choice	Instruments don't match the type of music No percussion	Instruments have to match the type of music At least one percussion track (drums, congos, tambourine)	The instruments all match the type of music At least one percussion track
How it sounds together	Doesn't match together The sounds clash No melody/too many instruments taking the melody	All the sounds match together, like a family. The sounds don't clash. Strong melody by one instrument	
Tempo	The wrong tempo for the style (too fast, too slow)	Fits the style of music	Fits the style of the music perfectly
Dynamics	Doesn't fit the style of music (too loud or too soft for the style) OR Random louds and quiets	Fits the style of music (sad – quiet, angry – loud...)	Fits the style of music (sad – quiet, angry – loud...)
Overall Mood	Style of music is unclear	Has a clear mood of the song	Very clear mood of the song

Figure 5. Example of peer-marked matrix.

Reflect on own compositions in relation to matrix

A variety of methods were used to encourage students to reflect on their compositions. Initially, prior to the development of the matrix, students addressed specific prompts regarding their compositions as part of their diary writing for the day, including what I learned today about using GarageBand, what I learned today about music and what sounds good, what I like about my piece of music, what I think I could do differently next time. Once the matrix had been designed, students were directed to evaluate their compositions against it before coming up for conferencing.

5.5 Adaptations to planning

Before starting the unit, I designed a general overview of the programme to give a picture of where I was heading, what I wanted the children to achieve and what activities I would present to support their learning [Appendix F]. It was intended that while the specific learning outcomes would remain the same, the unit would develop as the needs of the children became more apparent and in accordance with the recursive nature of action research.

Direct scaffolding and modelling were included throughout the intervention to teach the features of GarageBand as required. For example, during the first exploratory lesson on using the GarageBand app, I observed that none of the students had noticed the metronome 'ticking' in the background of their compositions. The following lesson started with a specific lesson on the purpose of a metronome and how to turn it off.

It became very evident from the beginning that there were some major knowledge/skill gaps for many children. This was particularly noticeable in students' knowledge of the musical elements and the names and purposes of instruments. This was often addressed by direct teaching from me. For example, one student asked where to find a flute sound in the loops. I stopped the class and had everyone open up the loops catalogue. We looked at the different categories and discussed what instruments were found within them; for example, 'woodwind' is the collection of instruments that includes flutes, saxophones etc.

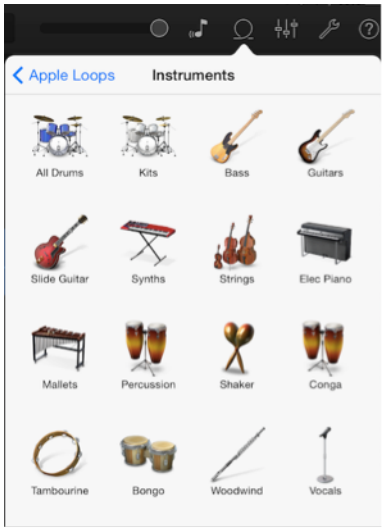


Figure 6. Example of the loops catalogue (Source GarageBand for iOS app)

These gaps also had an impact on what I taught. I had intended that students be introduced to binary and ternary form and use this when composing their own pieces. For most students, however, this was too difficult. After one lesson on it, I decided to shelve that idea and focus on more pressing issues, such as ensuring the loops chosen didn't clash. A major emphasis became encouraging students to listen to the work that they had produced to ensure it sounded 'right'. For example, in Week 9, Term 2, Alex and Archie brought up their 'finished' composition. They very proudly announced that they had included six looping tracks with different instruments. In listening to it, however, the loops all clashed. I had a discussion with the boys about trying to make sure that the sounds fitted together nicely and that one stood out as the main melodic instrument, with the others supporting it. This learning was shared with the class and later developed by my introducing the terms 'melody' and 'harmony'.

I had expected that the touch-based and smart-instruments would play a large part in the students' compositions. However, it soon became clear that to include self-recorded tracks alongside melodic loops, students needed to have a developed understanding of chord progressions, key signatures and related notes. This was not knowledge that my children possessed. Once this was clear, the smart-instruments were used predominantly in compositions by themselves – for example, when learning about chord changes with no expectation that loops

be used alongside them. The emphasis soon became “include the smart instruments in your composition if you can”, rather than it being a requirement.

The other issue around the smart instruments was that some students saw ‘playing’ them as an opportunity to hit the screen randomly without considering whether they were producing a musical sound. I noticed that many students were changing the chords in the smart instruments haphazardly, in the middle of the bars, with sometimes 12 changes in a song. Subsequent lessons discussed the ‘mathematics’ of music, how chord changes usually appear on an even bar, and how a well-rounded feel is achieved by starting and finishing on the same chord.

The musical level of the students and the degree of aesthetic awareness that were demonstrated by the students underpinned the modifications that were made in my teaching. As my knowledge of the students increased, my lessons became more specifically tailored to what was needed to extend them further.

Chapter 6: Findings

6.1 Introduction

This chapter reports on the impact of the intervention described in Chapter Five. It discusses the findings emerging from the intervention data under the headings of the key research questions: Students' attitudes towards composing with GarageBand; the guidance required for students to compose and the musical response to *Colour the Stars* (McMillan, 2012) generated through the GarageBand for iOS app. This chapter draws on data from the student questionnaires, the semi-structured interview with the focus group, the teacher-researcher's journal and the students' compositions.

6.2 Students' attitudes towards composing with GarageBand

6.2.1 The impact of the teacher

One of the themes that emerged throughout the focus group interview was the impact of the role of the teacher throughout the intervention for helping students learn about music and GarageBand. Direct modelling was quoted as being the key reason why 3 students in the focus group felt more confident about making music using GarageBand.

> I feel more confident than I was when I first got onto GarageBand because she [the teacher] helped us learn the steps instead of just setting us off on our own to figure it out. Like, she would sit us on the mat and actually explain it. (Lydia)

It was felt that modelling also helped the students to learn about the musical elements and their place within songs.

> I think it sort of helped as well when she airplayed the GarageBand onto the screen and gave us examples of what song would be high or fast or loud or something. (Sophie)

Toby mentioned how learning the technical language of the musical elements had helped his confidence in composing. His change in confidence was the most marked of the class, as he was the only student to state that he was not confident

with either composing or using GarageBand in the pre-intervention questionnaire.

> If she told me to do a task on GarageBand music now, I would be a lot more confident than originally because when I originally thought of music I didn't know any of what technical words meant, like dynamics or tempo and stuff like that… Well now I know what tempo I should use, when I should use it and why to use it. (Toby)

6.2.2 Task design

All of the students in the focus group responded positively to the concept of designing music to support a text.

> I liked doing it from a story because there are some parts that you can make actually sound like the story and then you can just, like, support the story with it. (Ruby)

Three students commented that having the specific focus of composing for a text made them feel much more confident to compose, as opposed to being asked to just compose without a specific focus.

> I liked having a set thing. Like, instead of just if Mrs Prentice says go and make some music I don't know what to do. But when she tells us we have to do it on a colour or something, I find it easier. (Eli)

A number of the participants mentioned the literacy aspect of the task, in particular the act of choosing key words from a text and using those as the basis for composing. One student commented on the benefit of including writing within the unit.

> I thought it was a good idea how Mrs Prentice told us to write about a colour and, cos I did yellow as well for my writing, and it helped me think about what we were going to do for the music, cos I could just look in my book and see how it feels and stuff. So I thought it was quite happy. And yeah. That sort of helped me making the music. (Sophie)

A challenge for some children was in understanding how to represent the particular colour they had been given.

> It was hard… Cos red didn't like, I couldn't really describe red so it wasn't really … easy. It wasn't easy. (Kaiden)

6.2.3 Collaborating with peers

Another theme that emerged throughout the post-intervention questionnaire and the focus group interview was the positive value of collaborating with a peer. Of the 23 students who completed the post-intervention questionnaire, 17 stated that they enjoyed working with a buddy and five stated that they 'sort of' did. Only 1 student did 'not really' enjoy working with a buddy. Twenty students believed that working with a buddy had helped them in making their composition, and 3 said it "didn't make a difference". Eighteen students said that on the next task they would like to work with a buddy and 5 students said they would prefer to work by themselves.

The most common reason cited for why students enjoyed working with a buddy was that it was good to have someone else's ideas.

> I like working in a partner because if you got like two things together and you weren't quite sure if they matched or not, you could get your partner's opinion. (Ruby)

Another common positive of working with a partner was the opportunity to help each other if they weren't sure of what to do on the app or lacked some knowledge.

> Eli: I like working with a partner because he might know more than you like if you are stuck on something he might know, or he might know what it is.
>
> Kaiden: Like, I know how to play drums and Eli knows how to play keyboard or something.

Of the 6 children who expressed some reservation about their experiences in working with a peer in the post-intervention questionnaire, the common complaint was that their partner disagreed with their musical choices and wouldn't listen to them.

All members of the focus group saw having a partner that was judicious in their loop choice and offered constructive suggestions as a positive. Their complaint was with previous partners they had worked with who had not done so. Of the 4 students who experienced challenges in working with a buddy, the explanation given by all was that the partner wasn't making choices that sounded good musically; either their partner thought something worked but to them it didn't, or the partner wanted to put particular loops in, regardless of whether it worked or not.

> I do like working with a partner but I don't. Cause some partners are really good to work with because they have these other instruments that sound good together, and other partners, they just chuck random things on the board and they say, 'This sounds so good', but sometimes it doesn't. (Sophie)

6.2.4 Using GarageBand

Students were asked in the post-intervention questionnaire to rank how much they enjoyed using GarageBand on a scale from 1–5, with 1 being "Really don't like using it" to 5, "Love using it". All of the students ranked it a 3 or higher, with 3 students ranking it a 3 (like using it), 7 students ranking it a 4 (really like using it) and 13 students ranking it a 5 (love using it). Students were also asked if they felt it likely that they would use GarageBand in their own time. One student said they wouldn't use it, 1 student said they probably wouldn't use it, 14 said they might use it and 7 said they would definitely use it in their spare time.

All of the children in the focus group felt positive about the use of GarageBand. Two students in the focus group commented particularly on their enjoyment in using GarageBand to create music. Toby stated:

> When I use GarageBand I like making cool combinations that sound good and feel good in some cases and, like, just sound right so they're not clashing or any of that.

In the post-intervention questionnaire, a common comment was that the loops made composing easier, because "you can get sounds off of loops instead of making your own" (Aaliyah). There was a consensus, however, that the limited

number of slower-sounding loops within GarageBand made it very difficult to compose particular moods, in particular 'sad' and 'calm' music.

> Occasionally when you get a set task from a book there's occasionally, there won't be anything that goes sounds like that, or has anything to do with it, basically. Which is what made blue hard, there was basically nothing calm in all of GarageBand. (Toby)

The 'lack' of loops was cited as the reason why all 3 groups in the focus interview were not completely satisfied with the state of their composition as it currently stood. Two students mentioned experimenting with decreasing the tempo in order to produce the sound that they were after, but they felt this didn't work very well:

> It gives you a set tempo where every instrument sounds good but then when you speed it up to… Like me and Kaiden were being silly and sped it up to like 200 and then it sounds terrible. (Eli)
>
> That's why you don't change the tempo… (Toby)

Another major frustration that emerged throughout the interview was in using the smart instruments. Specific reasons given for this were that it was "really confusing", and that students couldn't make it work with the other loops they had included. It was during one lesson, when students were trying to apply the 'arpeggiator' function on the smart instrument together with loops, that I observed the first negative talk, as Archie commented, "I'm no good at music." All 3 of the groups within the focus group had trialled using the smart instruments for their final *Colour the Stars* (McMillan, 2012) composition, and all 3 subsequently deleted the track. In total, only 2 groups indicated that they had used a smart instrument in their final composition. Four groups had included their voice within their compositions, either to state a key line from the text (e.g., "I know black") or to provide a sound effect, such as the wind blowing.

Surprisingly, the 'Jam Session' was the first feature mentioned in the focus interview when asked what they had enjoyed about using GarageBand, although a lengthy discussion about the frustrations and difficulties associated with its use also ensued. All of these were technical difficulties: both students didn't have

access to the loops, the 'leader' function wouldn't work correctly, and they couldn't connect to each other's iPads unless sitting right next to each other.

6.3 Guidance provided for students to compose

Throughout the intervention specific guidance was provided to the children in order for them to frame a response to a multimodal text in musical terms using the GarageBand for iOS app. This included direct instruction of the features of GarageBand and on identifying the musical elements within pieces, the use of criteria or a co-constructed matrix, an open-ended task design, providing feedback to students about their compositions, managing noise, being flexible around time, and facilitating the collaboration of students.

6.3.1 Direct instruction

Throughout the unit, lessons began with whole-class explanations of a specific feature of the GarageBand app that related to the objective of the lesson, for example, how to add the loops or making chord changes using the smart instruments. The teacher's iPad was projected onto the whiteboard using Apple TV so students could see what was being done. Students were then given time to apply the skill themselves, either individually or in pairs. As already stated, students noted this as being useful to their learning during the focus group interview and cited it as being a reason for being more confident. In order to do this, it was necessary to have a good understanding of the features of GarageBand myself. This was also called upon when students were working in individual tasks, as I was often required to 'trouble-shoot' difficulties they were experiencing.

The need for specific guidance from the teacher in the use of GarageBand was particularly noted when using the smart instruments. The students were initially given time to explore the feature by themselves and record a short, eight-bar composition. Many students produced music that was a random collection of chords that changed haphazardly in the middle of bars. In subsequent lessons I applied my own prior knowledge of chord progressions to teach the students

about returning to the original chord they had started on to produce a 'well-rounded' sound and in changing chords at the end of a bar.

Students were directed by me throughout the intervention in identifying the musical elements of *pitch*, *dynamics*, *tempo* and *timbre* within existing compositions, and in discussing how these elements impacted on the mood of a piece. In order to do so, I had to be familiar with these concepts myself and how these could be controlled on the app (e.g., the measure of tempo through beats per minute and the function of a metronome).

6.3.2 Use of criteria and a co-constructed matrix

Students were guided by criteria for the practical elements of their compositions. When students felt they had 'finished', they were redirected back to the criteria to ensure they had met the requirements. In the second part of the intervention, a matrix was co-constructed on the features of an 'amazing GarageBand composition'. I wanted the matrix to be referred to as students composed. The criteria, and then later the matrix, were used as the basis for specific feedback that the teacher provided to students and also for the marking of the compositions post intervention.

Students were asked in the post-intervention questionnaire whether having the matrix helped them with their composing. Seventeen of the students said yes and 6 said no, although no child elaborated on why that was.

6.3.3 Task design

The design of the tasks throughout the intervention was open-ended. The final task, for example, was "Create music that reflects your particular colour", using a page of the multi-modal text from *Colour the Stars* (McMillan, 2012) for inspiration. The students were then directed through particular steps. They were instructed to brainstorm with their partner what they felt the mood was, how this could be reflected through the elements of music and particular instruments, and how they might structure their piece. Once this brainstorm had been viewed

by me, the students worked in their pairs to compose. They had the use of the matrix and feedback from me to guide them throughout the rest of the process.

6.3.4 Feedback about compositions

The students were guided in the compositional process through feedback. Most of the feedback provided was delivered as I roamed the class, asking children how they were going or answering specific questions. Suggestions were delivered verbally, both one-on-one and also occasionally by stopping the class and having a whole-class-discussion about an issue, so other students could benefit from the advice. A major focus of the feedback was to ask the students to listen back to their compositions and ensure all tracks fitted with each and that it sounded 'right'. I noted in my reflective diary that a few students took most of my time, and other children would never ask for help unless specifically prompted. In response to this situation I set up a 'conference' time, where every student wrote their names on the board and I called them up to talk through their compositions. It was a continuing challenge to adequately talk through each child's composition in-depth.

6.3.5 Managing noise

A major issue was the noise generated by 28 iPads using GarageBand. As the school did not have a class set of headphones, students were encouraged to bring headphones from home. While this cut down the noise, it also increased the need for careful monitoring around the classroom to ensure students stayed on task. Once students started working in pairs, most tended to share one set of headphones between them, with one earplug per student.

6.3.6 Timing

For the first part of the intervention, where students were involved in more exploratory play with the GarageBand app, half-hour slots were allocated throughout the weekly class programme. This was increasingly frustrating, as it didn't practically allow enough time for students to compose once the iPads were all handed out and instructions given. This was noted many times in my reflective diary, for example:

> The process of composing using GarageBand took a lot longer than I had expected it to. I had allocated half-hour slots throughout the weekly programme, but this was frustrating for everyone — by the time the iPads and headphones were collected, 5-10 minutes had been used. Half an hour was also not enough time to allow me to move around the room and address any hurdles children were experiencing as well as give feedback/feedforward ideas to the children. This impacted on the standard of the finished products *(End of Part 1 intervention)*

During the second half of the intervention, I was more flexible about timing. In composing the final task for *Colour the Stars* (McMillan, 2012), students were given as much as 3 hours each day for 3 days.

6.3.7 Collaborating with peers

I was unsure at the start of the intervention whether or not students would work individually or in pairs to compose. For all of Part 1, students worked by themselves on their individual iPads. I felt that for all students to take part in the exploration process, they needed to have direct access to their own iPad. There was a lot of sharing with the class and discussion amongst one another, but students were individually in charge of their work. I trialled the students working in pairs with a partner of their choice for the first time during *The Forgotten Garden* (Repchuk, 1997) compositional task. I noted in my reflective diary:

> Working in pairs was a really effective way to get children talking with each other and collaborating together. In choosing partners students were directed to choose someone they knew they would work well with and all children made really good choices — some were quite different from whom they would normally work alongside. There was much less questioning of me about whether the sounds sounded right or not, and much more dialogue between the children. (*Reflective diary, Week 8, Lesson 1)*

I was particularly pleased when students remained on task and seemed to be collaborating really well. The one exception was one child who often had difficulty working in groups and was unable to independently find a partner to work with. Future compositions were conducted in peer groups, with the students choosing their own partners. There was a need to continually monitor the pairings to ensure that the pairs were working effectively together and sharing the workload.

Throughout the intervention, many children found extra features within GarageBand by exploring the app themselves. When a discovery was made that I felt might benefit other students, these were shared with the class and those students would often become the 'experts' and help others if needed. For example, in Week 7, Daniel made the comment, "I've made the instruments too loud, so I have to turn the whole thing down." In sharing this issue with the class, Alex commented that he had discovered how to turn the individual tracks down by swiping the instruments column to the right. This caused lots of excitement within the class and became an essential element of students' future compositions. At the end of particular lessons, we would discuss any of the frustrations that students had experienced and any solutions other class members had found to them.

At the end of most lessons, students were invited to share their compositions with their peers. Bolden (2007) describes the experience of sharing compositions as being powerful and an experience that students desperately desire and deserve. Throughout the intervention, most students were keen to have their compositions shared with the class. This served as positive reinforcement for the students themselves, and also provided ideas for the others. For example, during *The Forgotten Garden* (Repchuk, 1997) lesson in Week 8, I wrote in my reflective diary:

> We had a discussion afterwards about what worked and didn't and added these thoughts to our original matrix. Two students' work stood out to the class as being really effective. It was different to other compositions as it

used a guitar riff instead of strings to produce the 'sad' sound. (Reflective Diary, Week 8)

Following this lesson I noted in my reflective diary that several groups used guitar loops in place of the strings to convey their mood.

6.4 The musical response to *Colour the Stars* generated through the GarageBand for iOS app

6.4.1 Success relating to the matrix

The students' final *Colour the Stars* (McMillan, 2012) compositions were marked by me at the conclusion of the unit. They were judged according to how well their compositions met the matrix criteria: Still Learning [SL], Sounds Good [SG] and Sounds Amazing [SA]. These results are shown in Table 5.

Table 5. Analysed Compositions According to the Matrix

Composition analysis

	Colour	Instrument tracks			Instrument choice			Smart instruments			Where tracks are added		
Students		<4	4	4+	SL	SG	SA	SL	SG	SA	SL	SG	SA
Kaiden & Eli	Red			x			x		n/a				x
Blaire & Ben	Red		x			x			n/a		x		
Toby & Alex	Blue			x			x		x				x
Matthew & Stephe	Brown			x		x		x				x	
Archie & Daniel	Green			x			x		n/a		x		
Micah & Dean	Stars & black		x			x		x			x		
Abby & Ruth	Stars		x				x		n/a			x	
Lydia, Ruby & Soph	Yellow		x				x		n/a			x	
Alice & Aaliyah	Blue			x			x		n/a		x		
Rosie & Jane	Green	x				x			n/a			x	
Zoe & Madison	Yellow		x			x			x			x	
Poppy & Zara	Stars & black			x		x			n/a			x	

	Colour	Tempo			Dynamics			Structure			How it sounds together		
Students		SL	SG	SA	SL	SG	SA	SL	SG	SA	SL	SG	SA
Kaiden & Eli	Red			x			x			x			x
Blaire & Ben	Red		x			x			x		x		
Toby & Alex	Blue			x			x			x			x
Matthew & Stephe	Brown		x			x				x		x	
Archie & Daniel	Green			x			x		x			x	
Micah & Dean	Stars & black		x			x		x				x	
Abby & Ruth	Stars			x			x	x					x
Lydia, Ruby & Soph	Yellow		x			x			x				x
Alice & Aaliyah	Blue			x			x		x		x		
Rosie & Jane	Green		x			x		x				x	
Zoe & Madison	Yellow		x			x			x			x	
Poppy & Zara	Stars & black		x			x			x			x	

As shown in the table, the majority of children were successful in many of the categories, including using at least four tracks, choosing instruments that supported their mood, ensuring the loops sounded 'right' together, and setting an appropriate tempo and dynamics. There was mixed success in the use of smart instruments (only attempted by four groups, and only two successfully), the placement of the tracks, and in structuring the piece with a clear beginning, middle and end.

The compositions were then marked on how well pupils represented the overall mood they were trying to achieve (see Table 6). It was felt that 3 groups achieved a 'sounds amazing' composition, 8 groups achieved a 'sounds good', and 1 group was 'still learning'.

Table 6. Overall Results of Analysed Compositions

Composition analysis

	Colour	Overall Mood			General comments
Students		SL	SG	SA	
Kaiden & Eli	Red			x	Two sections. Effective composition.
Blaire & Ben	Red		x		Two sections. Loops added on second bar - feels disjointed.
Toby & Alex	Blue			x	Wide range of loops used. Experimentation. Very effective
Matthew & Stephe	Brown		x		3 distinct segments, unrelated. Use of smart drums, a bit random
Archie & Daniel	Green			x	No melodic line, all percussion. Use of flute to signifiy birds. Very effective
Micah & Dean	Stars & black	x			Use of voice for key sentence in the text. Loops do not match the mood.
Abby & Ruth	Stars		x		Too short! (6 secs). What is present is very effective.
Lydia, Ruby & Soph	Yellow		x		Four loops throughout. Nice piece, but little experimentation
Alice & Aaliyah	Blue		x		Clashes in loops. Loops added in random places.
Rosie & Jane	Green		x		Three loops throughout. Nice piece, but little experimentation
Zoe & Madison	Yellow		x		Fairly effective. Use of voice for key sentence in the text
Poppy & Zara	Stars & black		x		Three distinct sections. Loops not layered on top of each other

6.4.2 Structure of the composition

The students took three different approaches to using the loops within their compositions. Two groups used the same three or four loops throughout the entire piece and applied the 'fade' out button to provide an ending to the piece, as illustrated in Figure 7.

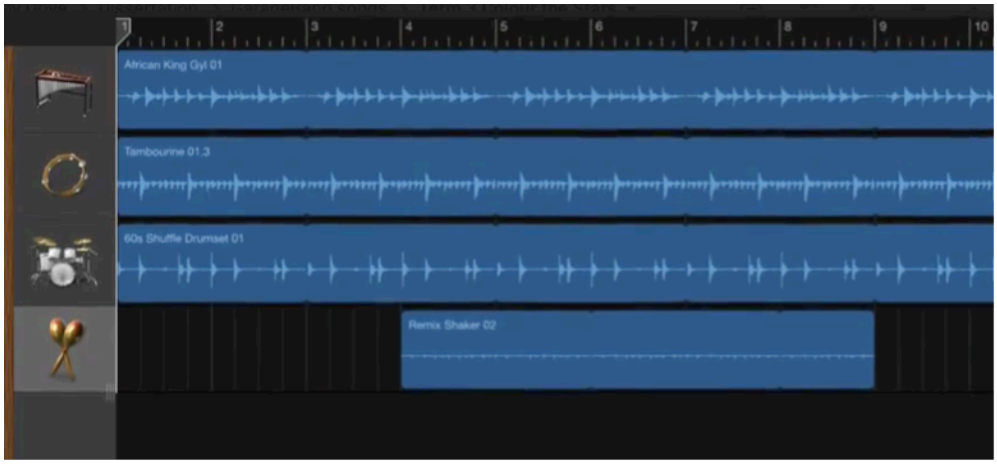


Figure 7. Ruby, Sophie & Lydia's composition (Source GarageBand for iOS app).

Another approach applied by 6 groups was to layer the loops in at different places throughout the composition while still retaining one whole section. A sense of a beginning, middle and end was achieved by adjusting the number of loops up and down. This is illustrated in Figure 8.

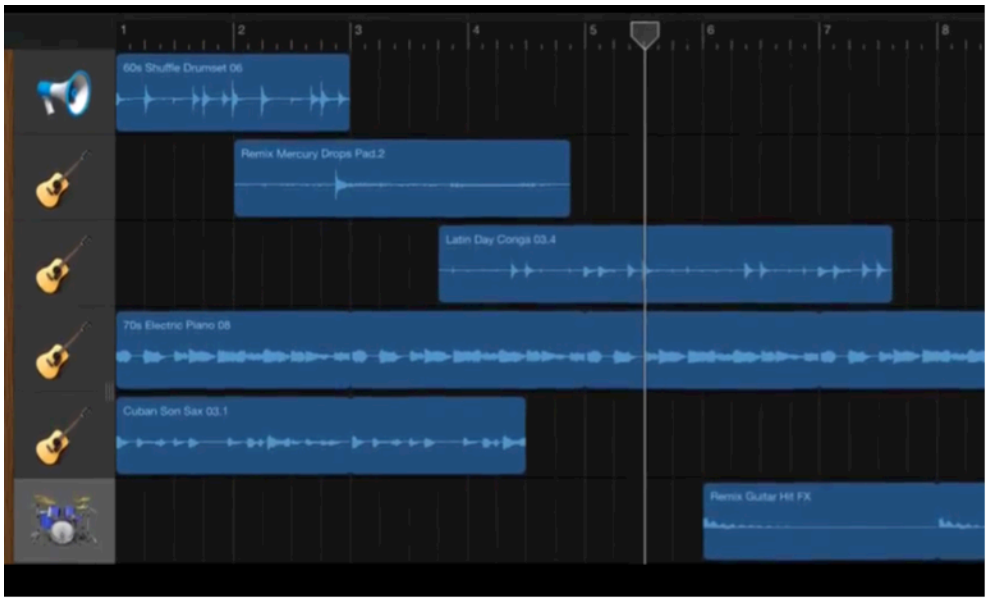


Figure 8. Alex and Toby's composition (Source GarageBand for iOS app).

The final approach applied by 4 groups was to have defined sections within the piece. This either signified the 'beginning, middle and end' of the piece (as shown in the screenshot of Matthew and Stephen's composition in Figure 9) or represented different sections within the text that children had been given.

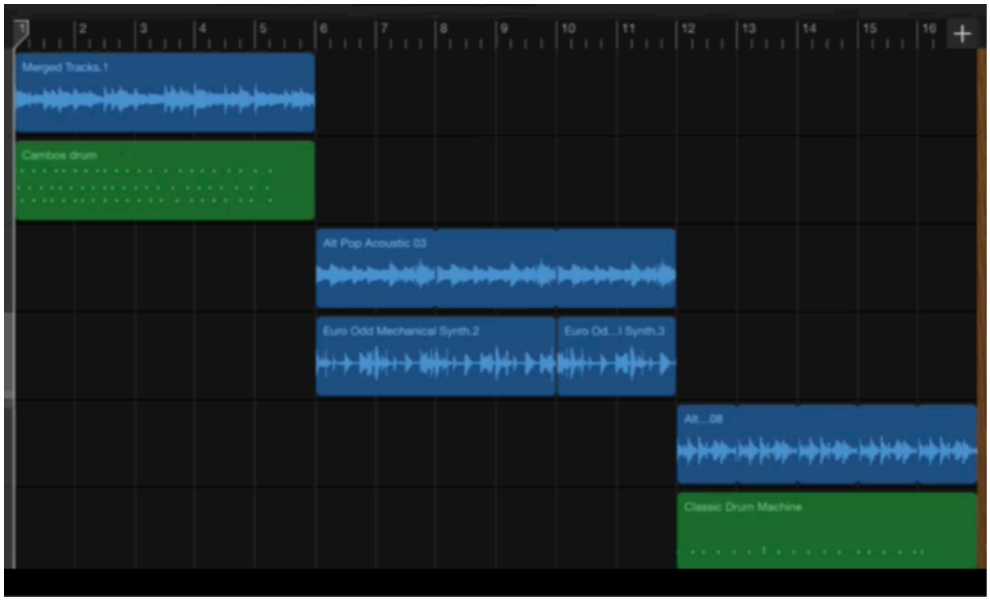


Figure 9. Matthew and Stephen's composition (Source GarageBand for iOS app)

6.4.3 Compositional approach

The students took two approaches to composing their pieces. The first was to choose an overall mood and compose music that reflected that mood. For example, Rosie and Jane created 'peaceful' music to represent their green, and Abby and Ruth created a 'chilled' mood to represent standing under the stars.

The second approach was to compose music that directly reflected words or images in the text. For example, for their 'green' composition, Daniel and Archie used percussion instruments to represent the ferns mentioned in the text and a flute loop to represent birds. Eli and Kaiden designed their 'red' composition to show the progression of a child walking happily and then stubbing his toe, causing it to bleed. Their composition had two distinct sections: a 'happy' start, then a drum roll to represent stubbing the toe with the use of strings, drums and a keyboard to represent the pain of blood (see Figure 10).

Figure 10. Eli and Kaiden's composition (Source GarageBand for iOS app).

6.4.4 Knowledge of the elements

In the post-intervention questionnaire, students were asked to describe what 'pitch', 'tempo' and 'dynamics' were and how they had used these elements in their compositions to reflect the mood. Twenty-one of the students were able to define pitch correctly, 22 defined tempo correctly and 16 defined dynamics correctly. There was a mixed response to the prompt inviting students to describe how they used these elements in their composition. Eight students identified how they had used pitch to show the mood. All 23 identified the tempo they had set their music at. Dean explained he had made the tempo of his 'star' music slow "because at night when I look up at the stars I'm tired and I'm slow." Fifteen students were able to describe how they used dynamics. Sophie stated, for example, "In our music we used soft and medium dynamics. The soft was the tambourine and the medium was the shaker and we did have loud. That was the mallet."

6.5 Summary

In this chapter I have reported on the relevant findings from the intervention in relation to the research questions. In the next chapter, these findings will be discussed in light of some relevant literature.

Chapter 7: Discussion

7.1 Introduction

This chapter will discuss the findings related to the key research questions in light of some relevant literature, consider practical implications of the study for professional practice, and limitations of the study. The chapter will conclude with suggestions for future research and a summary.

7.2. Findings

7.2.1 Students' attitudes towards using GarageBand for iOS to compose music

All students responded positively to using GarageBand for iOS to compose music. In particular they enjoyed using the loops and experimenting with the Jam session to compose pieces together with their peers. Using the loops was viewed by many of the students as making composing easier. From a teacher's perspective, using loops enabled the students to produce music that went well beyond what would have been possible without them (Crow, 2006; McDowall, 2008).

A perceived lack of 'sad and 'calm' sounding loops was a common frustration of the students. The original intention of the unit was to address this issue by using the smart instruments to compose new tracks. Through trialling its use, however, it became clear that to use them creatively and alongside other loops, a variety of skills needed to first be in place. This included foundational understandings of rhythm, key signature and chord progressions, as well as the ability to determine aurally if and when the loops changed chords. The lack of this knowledge in all the students rendered the smart instruments effectively inaccessible; they all commented that they found it very difficult to make them sound 'right' with the loops. In the end only two groups used smart instruments within their final *Colour the Stars* (McMillan, 2012) compositions, one a drum pattern (which lacked consistency and was out of time with the other loops), the

other using chords played on the smart guitar (which worked, as the other loops accompanying it were percussion-based).

In my own view, the benefit of the smart instrument feature in GarageBand for upper primary students is its potential for extending students' musical knowledge. Through its use, students were introduced to the concept of chords and chord progressions when composing (for example, starting and ending on the same chord and changing chords at the end of bars, not within). This was prior knowledge that many of the students did not possess. For older students I see potential for developing students' aural skills. Students could be encouraged to listen to particular loops, identify when the chords change within them and then compose music on the smart instruments to support this. This is a required skill at Level Four of The Arts curriculum (taught from Year 7 upwards). It states that students will "Apply knowledge of the elements of music, structural devices, and technologies through integrating aural, practical and theoretical skills" (MOE, 2007, Music-Sound Arts, "Developing Practical Knowledge", para. 2). Existing research in using GarageBand has not explored the use of the smart instruments, which would be an interesting focus for future research.

7.2.2 Guidance required for students to frame a response to a multimodal text using GarageBand

The findings indicate that a range of strategies was required to guide the students in composing using GarageBand. This included providing constraints in keeping with the concept of 'proscription', providing feedback, encouraging and supporting collaborative learning, and allowing time for the students to compose.

Several constraints were applied throughout the intervention. Constraints are defined as "sets of limitations or conditions that guide the process of decision-making" (Burnard & Younker, 2002, p. 248). These included explicitly modelling specific GarageBand features, with time following for students to practise them; giving a focus for composing (for example, a specific page from a text); directing students through the composition process; and using the matrix to guide

students in the specific features of the app they had to use; and the desired final effect of creating an 'overall' mood. Some researchers argue that constraints, as limitations placed on compositional resources, make composing manageable, serve to guide the process of decision-making and may encourage a range of compositional strategies (Burnard, 1995; Burnard & Younker, 2002; Kratus, 1989; L. Locke & T. Locke, 2011). Student views in this case study are in accordance with these researchers. For many students, being given a specific focus for composing greatly helped their confidence. Burnard (1995) states that constraints are particularly important for less experienced students, as they may not have sufficient prior knowledge from which to draw to determine creative boundaries for themselves. Several students also commented on their increased confidence in using GarageBand after having the features explained, rather than having to work them out themselves.

Alongside the concept of constraints is the notion of 'proscription'. Proscription describes situations that set "the bounds on the acceptable behaviour while they offer the conditions to explain the sphere of the possible" (Davis & Simmt, 2003, p. 147). Hung, Chee, Hedberg and Seng (2005) link proscription to the promotion of creativity:

> A proscriptive design facilitates creativity because it merely sets up some constraints or parameters, but does not rigidly determine how the goal is to be achieved… A proscriptive design sets minimal parameters for an environment so that creative processes on the part of the learner can be manifested. (p. 164)

The term 'liberating constraints' describes the use of constraints in a proscriptive manner enabling generative activity. Davis, Sumara and Luce-Kapler (2008) summarise this as "a phrase that describes the balance between freedom and restraint that creates conditions for learning and creativity" (p. 87). This was achieved by the open-ended design of the tasks; students could interpret their given text as they saw fit and compose accordingly. They were then directed through the process via the aforementioned constraints. The diverse approaches

applied to the task and structuring of the compositions are testament to the creativity that was allowed and encouraged throughout the intervention. In music education the expectation of and opportunity for pupils to individually develop their own composing pathway has been articulated in a variety of international curricula and professional documents (Burnard & Younker, 2004). Implicit in *The New Zealand Curriculum* objectives for composing is this flexible approach to composition (MOE, 2007). In line with this, Folkestad et al. (2007) state:

> Our results show that the ways in which music is created varies between individuals and between different kinds of music. An important implication of this is that there is no such thing as 'right' or 'wrong' with the respect to method or strategy by which music should be created, and consequently that school should not teach *the* method of composition, but rather create a context in which the pupils can explore their own ways into music composition. The knowledge of different strategies in composition which pupils spontaneously develop on their own… should be of great value to teachers guiding their pupils into the adventures of musical creation. (p. 95)

The students were guided whilst composing through feedback. The purpose of feedback, as described by Paynter (2000), is to draw students' attention to "what they know intuitively — that musical material has potential to go on — so that, by taking stock of what they have made up already, the imagination can begin to explore in new directions" (p. 21). The 'diagnose and fix' technique (Bolden, 2009) was the principal means of assessing compositions-in-progress and providing feedback. Most of the feedback was delivered as I circulated, asking children how they were going or answering specific questions. A major focus of the feedback asked students to listen back to their compositions and ensure that all the tracks fitted with each and that it sounded 'right'. At times this required directly pointing out specific areas. Students were also asked to refer back to the given criteria to ensure they had met the requirements of the task. Some were very quick to ask questions, either practical or musically related, and others

sought little assistance. An attempt to address this was to set up a 'conferencing' time, where students wrote their names on the board and were called up to discuss their compositions.

A prevalent theme noted across the findings was the importance of collaborative learning**.** This is reinforced in *The New Zealand Curriculum* (MOE, 2007), where facilitating shared learning and building a learning community is emphasised as a crucial pedagogical strategy. All the students in the focus group commented on the benefit of working with their peers for gaining ideas and for getting help. As noted in my reflective diary, once students started working on compositional tasks in pairs, questions to me dropped off significantly. Students were allowed to choose whom they worked with throughout the intervention. Hogg (1994) comments on the importance of allowing students to work in friendship groups when composing, because "imaginative ideas and cooperative striving need an optimum environment if they are to culminate in performances that have musical worth and personal meaning for the participants" (p. 21). In sharing compositions back to the class, other students picked up new ideas. I also noted many occasions where students were able to be the 'experts' and communicate what they had learned about the practicalities of using GarageBand to the class. There were, however, also occasions where the students experienced difficulties in working with a partner. L. Locke and T. Locke (2011) highlight the importance of the role of the teacher in facilitating, modelling, teaching and monitoring interactive processes within group work and see it having a vital determinant of the outcome of the collaborative compositional process.

A significant issue throughout the intervention was time. Although designed as a unit integrated with literacy, students needed time to be introduced to a range of musical elements and to explore the app and its related functions, before these could be developed further in their composing and introduced to the literacy focus. Van Ernst (1993) states:

> Knowing as a composer requires the individual to engage with the materials of music, giving form to ideas, feelings and images. The

> composer must understand how to use the structures of music to express musical ideas and must have some musical concepts to do so. (p. 23)

It became evident that many of the students had significant gaps in their knowledge that needed addressing. This, subsequently, became the major focus of Part 1 of the intervention. Unfortunately, at this point the time available for each lesson was generally restricted to 30-minute sessions. This was a frustrating amount of time for all, as it did not allow very long for students to have dedicated time to compose, particularly once 5–10 minutes were taken up in handing out the iPads and setting the task.

The literacy aspect was developed in Part 2, where the reading of various texts and writing reflections were introduced. In reflecting on Part 1 of the intervention, I felt it necessary to allocate larger blocks of time for composing, particularly when students were involved in the final compositional task for *Colour the Stars* (McMillan, 2012). A flexible approach to time allocation is viewed as desirable in recent studies of students' compositional processes (Barrett, 1998a; Hogg, 1994; van Ernst, 1993). While the aim of integrated learning was an appropriate one, in the ever-full curriculum, this still presented challenges.

My belief from the outset was that all generalist teachers could use GarageBand in the classroom. This view was supported by McDowall (2008), who states that contemporary music technology can be particularly useful in enabling generalist teachers to engage in teaching and learning situations that would previously have been out of their realm of expertise. There were four main roles undertaken by me as teacher during this intervention. Firstly, to introduce and develop students' understanding of the musical elements of 'pitch', dynamics' 'tempo' and 'timbre' and how these are used to set the mood of a piece, either in existing compositions or on their own. Secondly, to engender confidence in the basic functions of the app and to help students who were experiencing technical difficulties. Thirdly, to provide feedback to the students in how their compositions were progressing. (As discussed previously the major form of

feedback during this intervention asked students to listen to how their compositions sounded and to indicate to students where it didn't sound 'right'.) Fourthly, to moderate and monitor the students as they worked collaboratively. Neither of these factors call for specialist knowledge – rather knowledge that would be expected of a teacher of any subject: knowledge of the factors underpinning the subject (in this case, the musical elements), a practical understanding of the resource at hand (in this case, GarageBand) and an awareness of how to extend the children (in this case, listening). The area where specialist knowledge was more necessary was with the smart instruments, but as this feature was beyond the students' musical knowledge, it was not developed during the intervention. With this in mind, it is still my belief that a unit such as this could be taught by a generalist teacher with little musical training of their own, using the loops as the basis of the compositions. Future research is required to further test this belief and to ascertain the 'level' at which GarageBand can be used in a classroom for composition purposes.

7.2.3 The musical response to a multimodal text generated through the GarageBand for iOS app

The findings showed that GarageBand was a successful tool for involving students in aesthetic decision-making, engaging primary school students in the compositional process and allowing creativity in how students approached and outworked the task. Within the proscriptive nature of the task, students were able to self-regulate their level of challenge within the composition process.

Throughout the intervention students engaged in aesthetic decision-making. They explored how to apply musical concepts to a picture book and constructed their own interpretations, which informed their compositions. Students were constantly encouraged to listen to their music, to ensure it sounded 'right'. According to Paynter (2000), this sensitivity is "possibly the most important technique in composition" (p. 20). Students demonstrated their developing aesthetic awareness through comments made in the post-intervention questionnaire about what they had learnt about composing:

> That you can't just put down random things and think it sounds good. You have to change the dynamics, pitch and tempo. And sometimes the instruments. (Aaliyah)
>
> To try and find sounds that suit each other by listening to them. (Daniel)

Toby summed up the intended process of the intervention in the focus interview by stating,

> When I use GarageBand I like making cool combinations that sound good and feel good in some cases and, like, just sound right so they're not clashing or any of that.

An analysis of the students' compositions showed all were involved in the compositional process of exploration, selecting sounds, and structuring and revising their work. All produced compositions that had been thought through carefully and met the criteria to some extent. As reported in my analysis of the students' compositions, the majority of children were successful in meeting most of the criteria, including using at least four tracks, choosing instruments that supported their mood, ensuring the loops sounded 'right' together, setting an appropriate tempo and dynamics, and creating an overall mood that reflected their colour. There was mixed success in the use of smart instruments (only attempted by four groups, and only two successfully), the placement of the tracks and in the structuring of the piece. These areas were the much more musically demanding as they required greater aural skills. All groups did, however, show improvement in these aspects from previous compositions.

L. Locke and T. Locke (2011) believe the development of metacognition is "crucial for teachers wanting to help students improve their compositional products" (p. 279). Throughout the intervention the value of metacognition was reinforced. In the post-intervention questionnaire, 43% of the students were able to describe how they used pitch in their compositions, 65% were able to describe how they used dynamics and 100% of the students stated the particular tempo they used in their compositions. The fact that at least 43% of students were able to verbalise the reasons for their choices is impressive, as Kratus (1989) states that most children are unable to verbalise the reasons for their creative decisions as they compose because "the internalised rules underlying

children's acts of production are largely unconscious and because comments on one's own cognitive processes are often inaccurate" (p. 7).

Due to the proscriptive design of the tasks, the students spontaneously developed different strategies for composing, either taking a literal approach to the task by composing music that they felt directly reflected elements of the text and the illustrations, or composing music that reflected the overall mood. Those students who took a literal approach to the task of composing for a colour chose instruments they felt specifically matched the words or picture. The students who composed music that depicted an overall mood chose instruments that 'fitted' together more generally. The students also approached the structure of their compositions differently. Some children used the same three or four loops throughout the entire piece, others layered the loops at different places throughout the composition while still retaining one whole section, and others had discrete sections within the piece to reflect the text or the beginning, middle and end.

According to Mellor (2007), an open-ended (or proscriptive) task design allows the participants to self-regulate the level of challenge within their composition process. The analysis of students' compositions indicated that there was a range of complexity applied. Interestingly, this did not correlate with the students' musical ability. Ruby, Sophie and Lydia were the most capable students musically within the class and were involved in many specialist music groups outside of the classroom. Their final composition, however, used only four loops played throughout, with no experimentation or introduction of other instruments or loops. Through the focus group interview, it became evident that they had struggled to turn their initial ideas that involved smart instruments into reality; they had responded to this challenge by taking the easy option. In comparison, Alex and Toby, who were the most critical about their final composition in the focus interview, produced a highly effective composition that interspersed a range of different loops throughout. Similarly, Archie and Daniel's composition was highly effective in projecting the colour 'green' through the use of different percussion loops interspersed throughout and a flute riff. Archie was

the least confident musically in the class and had been the only student observed to make negative comments about his musical ability.

It is possible that this finding can be explained through the two different creative processes applied to the task. A common element of creative thinking found across definitions in the music education literature is problem-solving and its role in creative thinking (Webster, 1992, cited in Burnard & Younker, p. 2004). The creative thinking process involves stages that move between divergent and convergent thinking, while generating and evaluating solutions and converging on a final solution (Burnard & Younker, 2004). Divergent thinking is the generation of ideas or possible solutions, while convergent thinking, the selection of a single 'correct' solution is based on the evaluation of known possibilities (Webster, 1987, cited in Kratus, 1989). The girls described displayed convergent thinking in that they met the requirements of the task by settling on using four loops, based on what they felt was possible to achieve. They were unable (or unwilling) to problem-solve past the difficulties experienced with the smart instruments. Both boy groups displayed divergent thinking, in that they explored a variety of ideas in order to meet the task brief and developed these throughout the whole process.

In the final analysis, what is clear is that GarageBand provided opportunity for students of all musical backgrounds and confidence levels to develop their creativity through composition to produce professional sounding compositions and to problem-solve solutions to difficulties that they encountered.

7.3 Limitations

This study is limited by its small scale; it was conducted by one teacher with one classroom whose collective personality traits and life experiences played a significant part in the impact of the intervention. It took place in a dynamic social environment, which cannot be duplicated. Additionally, it was a largely qualitative piece of research and, as such, the researcher's unique worldview, biases and motives must be acknowledged as a factor influencing all aspects of the study. Input from a critical friend during the intervention may have provided

a useful set of data to compare against my findings and aided in validating the claims made in this report. Consequently, the findings of this piece of research, while suggestive, are not directly transferable to other situations.

The design of the pre-intervention questionnaire and post-intervention questionnaire were not the same. Unfortunately, this meant comparison between pre- and post-ratings was limited.

7.4 Implications of the study for professional practice

This study has shown that the 'loops' feature within the GarageBand for iOS app is appropriate to use with Year 5 and 6 students in order to introduce them to certain musical elements and develop their compositional abilities. It reinforces the important role of the teacher in providing scaffolding to the children through direct modelling of specific aspects of the app and providing feedback about compositions. The students of this study responded well to the impetus of composing for a text and produced creative responses within the 'liberating constraints' (Davis et al., 2008) of the task design.

I believe that GarageBand is an appropriate tool for generalist teachers of middle to upper primary aged children to use to introduce composition within their classrooms, regardless of musical background. In particular, the loops feature appears to be the most accessible. McDowall (2008) and Hallam et al. (2009) suggest that this is due to the scaffolding capabilities of looping software. A next step from this case study would be to trial the use of GarageBand with other generalist teachers. As my own background includes extensive prior musical experience, it would be interesting to study the use of GarageBand by teachers whose musical knowledge is much less than mine. Also, to explore what specific knowledge is called upon when teaching with GarageBand. This study concurs with the opinion of Barnes (2001), who argues that some understanding of the musical elements is essential. While debates around whether music education is *best* provided for by generalist or specialist teachers persist, GarageBand may offer a solution to counteract the current lack of music-making opportunities in primary schools.

Some of the features of the GarageBand for iOS app were only partly utilised in this project, particularly the smart instruments. There is considerable potential within the smart instruments for extending students in their musical knowledge and aural skills. As previously discussed, this fits very well with the expectations of Level 4 in the Music-Sound Arts curriculum (MOE, 2007). For these features to be used, however, it is my belief that this would be best done by a music specialist with older students, either an intermediate level or early high school. This would be an interesting focus for future research.

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Appendix A: Semi-structured interview questions

1. What have you most enjoyed about using GarageBand for iPad? Why?
2. What have you least enjoyed about using GarageBand for iPad? Why?
3. Did you enjoy working with your buddy? Why/why not?
4. Do you think working with a buddy helped you when creating your piece of music? If yes, how did they help? If no, why not?
5. Would you work with a buddy to create music again, or would you prefer to do it by yourself? Why?
6. What was the mood of your piece of music? What made you decide that? (be specific!)
7. How do you think you showed the mood in your piece of music?
8. How did you go about choosing the instruments for your GarageBand piece? What about them made you think they matched the mood?
9. Why did you structure your piece the way you did?
10. What have you learned about making music during this unit?

Appendix B: Consent letter: Principal

Dear _____ ,

Further to our conversations, this is a formal request to undertake the study on the use of the GarageBand app as part of my literacy programme in Room 1.

Data gathering will take place during Term 2 and will explore how the use of the iPad app GarageBand may help in the development of composition skills.

The research will involve students in Room 1 working in pairs with an iPad as part of their normal classroom activities. As they work they will be filmed, and these recordings analysed by me for evidence of the musical thinking involved. I will also be taking reflective notes throughout the process. Selected students will then be interviewed in their pairs by my critical friend, Hannah Henderson, where they will be invited to talk about how they approached the task, and any impact they felt using the app had on their learning. It is expected that this interview will take approximately 30 minutes. Work samples relating to student use of the object will be copied for analysis.

Results from the study will be used for my dissertation, in order to complete my Masters of Education. It is anticipated that results from this study will assist teachers at Hukanui and beyond to better use iPads to support the musical learning of students. They may also be used in some publications to be submitted to academic journals and/or other academic texts and in presentations. Any video footage that shows the faces of the students will not be used for any other purpose than data analysis. Should this research be shared at a presentation, any footage to be used will be videoed in such a way that the students cannot be identified.

Thank you for your informal agreement to allow my students to participate in this study. If you have any questions you would like answered regarding any aspect of this study, please do not hesitate to contact me.

Many thanks and kind regards,

Lauren Prentice

Appendix C: Consent letter: Parents/guardians

Dear whanau,

I am currently involved in completing my Masters of Education at the University of Waikato. As part of this I am doing a dissertation, which is a small research project that is completed under the guidance of an academic supervisor.

My dissertation will focus on how to include music within my literacy programme. Specifically, it will look at how the GarageBand app on iPad can be used to support students with composing music. It will form part of our current topic work around identity.

The research will involve your child working in pairs with the GarageBand app. Students will be composing music to accompany a page of text from the book *Colour the Stars* by Dawn McMillan. Before the unit, students will complete a questionnaire where they share their thoughts about composing and learning music. During the task, students will be filmed as they work, which will be analysed for evidence of how the app helps students to compose. Selected students will then be interviewed in their pairs, where they will be invited to talk about how they approached the task, using the video to prompt feedback, and any impact they felt using the iPad had on their learning. It is expected that this interview will take approximately 30 minutes. Work samples related to student use of the iPad will also be copied for analysis.

Any video footage that shows the faces of the students will not be used for any other purpose than data analysis. Should this research be shared at a presentation, any footage to be used will be videoed in such a way that the students cannot be identified.

As part of a dissertation, an electronic copy will become widely available, as the University of Waikato requires that a digital copy of Masters thesis be lodged permanently in the University's digital repository: Research Commons. The

name of the school and your child will be replaced with a pseudonym, to protect your child's anonymity.

I hope your child is able to participate in this study. If you agree to this, please sign the attached consent form and return it to school. If you have any questions you would like answered regarding any aspect of the study, please do not hesitate to email me or arrange a meeting.

Many thanks and kind regards,
Lauren Prentice

<u>Participation in Digital Learning Object Research Return Form</u>
I have read the information sheet regarding the digital learning object research project being undertaken at Hukanui School and I agree to allow my child to participate in the study in the following ways:

1. Data may be collected from my child while he/she is using the iPad □
2. Video footage of my child working on the iPad can be collected, with the understanding that any footage that identifies him/her will not be used for any other purpose than data analysis. □
3. Video footage of my child working on the iPad that has no identifying features can be used in future presentations □
4. Data may be collected from my child through questionnaires □
5. Data may be collected from my child through pair interviews □
6. Work samples relating to the use of the iPad my child produces may be copied for analysis □

I understand that the results of the study may be used in academic publications or presentations, but that no identifying pictures taken of my child while working with the objects will be used in any such publications or presentations.

If I have any questions relating to the study, or wish to withdraw my child from it, I may contact the researcher at any time.

Child's name: _____

Parent/caregiver (signed): _____

Appendix D: Consent letter: Students

Dear (name),

I am currently working on some research as part of my Waikato University studies. Over the next few weeks I will be investigating how we use GarageBand on the iPad as part of our Identity work.

I would like your permission to record some of the work you are doing while you are using the iPad to see how they help you learn and work together with others. To record your work, I will take video samples and observe you as you are working and make notes. This is so that I can go back later and have a look at my notes and, if necessary, talk with you and your workmate about them. I would also like you to complete a questionnaire at the beginning of the unit on GarageBand to find out your thoughts about making music.

If you have any questions about any of this, please talk to me or, if you don't want to take part in it anymore, you just have to tell me.

If you would like to join this project, please write your name and sign on the bottom of this page.

Thank you.
(signed)
Name: _____

I give permission for:

1. Mrs Prentice to use information from a questionnaire to help her research
2. Mrs Prentice to record my work while using the iPad
3. Mrs Prentice to talk to me and my workmate about our work afterwards
4. Mrs Prentice to take a copy of some of the work we do for this research

Signed: _____

Appendix E: Questionnaire questions

1. Gender: (circle)
    a. Boy
    b. Girl
2. Have you ever taken a music elective based on making your own music before?
    a. Yes. Why did you take it?

        _____

        _____

        _____

    b. No. Why did you not take it?

        _____

        _____

        _____
3. Have you ever made up your own music (composing) using any of the following techniques:
    a. Tapping a pattern you made up: Yes/no
    b. Singing a song you made up: Yes/no
    c. Playing a piece of music that you made up on an instrument: Yes/no
    d. Using an app on an iPad: yes/no.
        i. If yes, what one/s

            _____

            _____

            _____

    e. Using a program on the computer: yes/no.
        i. If yes, what one/s:

            _____

            _____

            _____

4. How do you feel about making up (composing) your own music? (circle the best answer)
    a. I don't feel confident so I don't do it
    b. I don't feel confident but will do it with a buddy
    c. I will give it a go
    d. I feel confident when I work with a buddy
    e. I feel confident doing it by myself.
    f. I feel totally confident doing it by myself.
5. Have you used the GarageBand app for iPad before? Yes/no
    a. If yes, where did you use it? (circle as many as fit):
        i. At school as part of classroom work
        ii. At school in my free time
        iii. At home
    b. If yes, how confident do you feel using it? (circle the best answer)
        i. I don't feel confident
        ii. I'm not very confident but will do it with a buddy
        iii. I will give it a go
        iv. I feel confident when I work with a buddy
        v. I feel confident doing it by myself.
        vi. I feel totally confident doing it by myself.

Appendix F: Intervention overview

Timing	SLOs	Activity/Task	Resources
Term 2 Week 6		Students complete pre-unit questionnaire to determine their attitudes to composition and music education.	Pre-unit questionnaire x28
Throughout unit , starting week 6	1	Students to explore GarageBand and become familiar with the tool. Look at pre-recorded loops, smart instruments, instruments, how to add different sections. Students to share back compositions to the class, asking for feedback and feedforward.	iPads with GarageBand for iOS x28
Throughout unit, starting week 6	2	Introduce musical elements: pitch, dynamics, tempo, timbre. How do we identify/measure these when listening to music (e.g. using a metronome)? Identify on instruments/pre-recorded loops in GarageBand and in instrumental pieces.	iPads with GarageBand for iOS x28
Week 8	7, 9	Students to create a 'happy' piece of music with a range of instruments. Share compositions back to the class. Save to shared folder on Google Drive.	iPads with GarageBand for iOS x28
Week 9	2, 4, 6,	Watch "*How Music Can Change a Film*" YouTube clip - Pirates of the Caribbean scene in four ways. Discuss the different moods (Triumphant and victorious, scary and foreboding, comical, sad and thoughtful) and the elements used to convey these – instruments, dynamics, speed etc. Students to choose a mood from the clip and try to create their own version.	YouTube clip: *How Music Can Change a Film* https://www.youtube.com/watch?v=rn9V0cN4NWs
Term 3, Week 3	2, 6,	Explore a range of instrumental pieces and identify the mood, specifying the different elements within them and the structure. Do you notice anything about what kinds of instruments and the elements of music are used to show specific moods? Create a display for around the room based on this.	See resources
Week 4	4, 6	As a class, brainstorm a range of possible moods, being as specific as possible. Display in the classroom for reference and to add to where appropriate.	Interactive whiteboard
Week 4	8	Create a matrix to show what makes an effective composition.	Interactive whiteboard
Week 4	2, 4, 6,	Watch *Lifted.* Explore how the soundtrack is used throughout the clip to set the mood of the particular scenes.	YouTube clip: Lifted http://www.youtube.com/watch?v=1pqnXR4U9w8
Week 5	8, 10, 11	Assign a different mood to students (sad). Criteria: Must have a range of instruments,	iPads

		must be in ternary form (ABA). Following the work, composers to justify why they chose the instruments and loops they used. Discuss compositions as a class and what works well and what could be improved (feedback, feedforward).	
Week 6	9	Read a variety of texts and identify the mood within them. Discuss the concept of 'soundtracks'	
Week 7	7, 8, 10, 11	**Reading:** Shared book: *Where the Wild Things Are* **Music**: Choose a passage where the children think it would suit to add a soundtrack to accompany the text. Share back to the class and discuss.	Text: *Where the Wild Things Are,* Maurice Sendak
Week 8	7, 8, 10, 11	**Reading:** Shared book: *The Forgotten Garden.* Discuss: What are the different moods of the text? (beginning: sombre, sad, lonely; middle: coming to life; at the end: happy, new life). **Music:** In pairs, students to create music to support the different themes of the story, Share back to the class. Discuss.	Text: *The Forgotten Garden*, Caroline Repchuk
Week 10	7, 8, 10, 11	**Reading:** Shared book: *Colour the Stars*. **Music:** Discuss what the mood of each page might be and record. As a class, look at the first page. Discuss the instruments that could be included and how these could be structured. • How do we layer in the instruments? • How do we show a good ending? • What sounds best fit the mood? Students to create music in their pairs. Discuss matrix - have all these elements been included? Share back to the class and discuss.	Text: *Colour the Stars,* Dawn McMillan, projector, iPads
Week 10	7, 8	**Music:** Students in pairs. Each group is assigned a colour, and must create a composition to match. **Writing:** Write 'colour poems', using the colour that students will be working with for their final composition.	Individual copies of specific pages from *Colour the Stars*, iPads x15.
Week 10	10, 11	Students share their compositions back to the class. Make comments and feed forward suggestions.	iPads
Week 10	10, 11	From feedforward suggestions, students to revise their compositions. Final sharing.	
Week 10		**Writing:** Students to research about guide dogs and write an explanation.	
Week 10		Contact the author, Dawn McMillan, to share our final composition with her and to	

		explain why we enjoyed the book.	
Week 10		Questionnaire to students about how they found the process, what they learned, their attitude to composition.	
Week 10		Semi-structured interview of focus group of students about the process.	

Resources:

Instrumental pieces:

- Flight of the Bumble Bee;
- Sic Transit Gloria Mundi,
- Suite for Solo Cello, Suite for Solo Cello No. 1 in G major
- Eine Kleine;
- Sleeping Beauty Suite, Op. 66, Introduction,
- Dance of the Cygnets (Swan Lake);
- Moonlight Sonata for Piano;
- The Nutcracker Suite, Op. 71A - Danses Caracteristiques: Danse De La Fée-Dragée;
- The Four Season – Spring;
- 1812 Overture
- William Tell Overture

Websites:

- *Intro to film scoring: Same Scene 5 ways:* https://www.youtube.com/watch?v=ktKcnDfWs2c
- *How music can change a film*: (Pirates of the Caribbean boat scene): https://www.youtube.com/watch?v=rn9V0cN4NWs
- *Lifted*: http://www.youtube.com/watch?v=1pqnXR4U9w8

Texts:

- Where the Wild Things Are, Maurice Sendak
- The Forgotten Garden, Caroline Repchuk
- Colour the Stars, Dawn McMillan (McMillan, 2012)