THE SECONDARY SCHOOL MUSIC CURRICULUM: AN INVESTIGATION OF DESIGNED LEARNING EXPERIENCES THAT PROMOTE MUSICAL UNDERSTANDING

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Research Portfolio Introduction

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1.1 Portfolio Introduction

This portfolio has applied a constructivist epistemological perspective to investigate the learning design and pedagogical considerations that promote musical understanding within the secondary school music curriculum. The research projects involved have been framed theoretically by the following ideas:

- Learning and teaching through use of experiences (John Dewey and David Kolb).
- Focussing learning and teaching upon constructing musical understanding (Jackie Wiggins).
- Designing learning so that the construction of certain understandings and meanings of knowledge becomes more likely (Charles Reigeluth, Grant Wiggins and Jay McTighe).

The following key definitions are referred to here as advanced organisational definitions and their basis will be established within this portfolio introduction:

- A music learning experience is when a person's current musical understanding is affirmed, enhanced or challenged.
- Designed music learning experiences are those where the teacher engages in intentional and direct planning to support student construction of knowledge, understanding and meaning.

1.1.1 Scope of Portfolio

This portfolio explores three distinct and contrasting designed learning experiences within a secondary school music curriculum. The three specific portfolio research topics are as follows:

1. Music ensemble competitions as designed music learning experiences: an examination of the role of ensemble competitions within the secondary school music curriculum and student perspectives on participating in ensemble competitions.
2. Teacher pedagogy within designed Music ICT learning experiences: examining the pedagogy of secondary classroom music teachers with regard to an extended music re-mix classroom activity using ICT.
3. Creation of a Music ICT instructional resource that demonstrates a constructivist influenced Music ICT learning framework and design model.

The aim is to identify and reflect upon the ways that these research topics represent designed musical learning experiences that contribute and relate to:

- Student learning.
- Promoting musical understanding.
- Pedagogy and classroom practice.
- Secondary school music curriculum.

The emphasis is upon examining teacher actions in designing curriculum and the accompanying pedagogical strategies which are intended to promote musical understanding. This research does not focus upon evaluating student learning outcomes nor the extent of student's musical understanding.

1.2 Folio Literature Review

To position this research folio, it has been necessary to firstly investigate the literature common to each of the unique portfolio topics. These common topics include: the process of learning; constructivism; the secondary school music curriculum; musical understanding; and designed music learning experiences.

1.2.1 The Process of Learning:

Knowledge, Experience, Learning, Meaning, and Understanding

Understanding how people learn and how to improve the efficiency of learning and teaching has challenged educators for centuries. During the twentieth century, the question of 'what' knowledge to teach and 'how' to teach this knowledge has resulted in many research informed approaches to school based education. One particular view of knowledge, namely constructivism, has found considerable support from reform minded educators. For many educators, this particular view of how they regard knowledge and knowledge construction has had a profound influence upon how they approach education; particularly the way they design teaching for student understanding (Fosnot, 2005 p.139; von Glasersfeld, 2005; Perkins, 1998). The process of learning will now be discussed in terms of current understandings regarding the formation of knowledge, the role of experience, learning as a cognitive process, the assigning of meaning, and the formation of understanding.

Knowledge is defined by the Oxford Dictionary as "facts, information, and skills acquired through experience or education; the theoretical or practical understanding of a subject" (Oxford Learners Dictionary, 2012). Another definition by the Cambridge Dictionaries elaborates this further by stating it is the "understanding of or information about a subject which a person gets by experience or study, and which is either in a person's mind or known by people generally; the state of knowing about or being familiar with something" (Cambridge Advanced Learner's Dictionary, 2012). These definitions indicate the importance of acquiring or 'getting' knowledge through an active process of experience or education. For educators, this is associated with the process of learning and teaching. Experience and events that create experiences are also highlighted as important for creating an environment or opportunity for people to gain knowledge.

Dictionary definitions regarding experience suggest that it is "the practical contact with and observation of facts or events; the knowledge or skill acquired by a period of practical experience of something" (Cambridge Advanced Learner's Dictionary, 2012), and the "practical contact with and observation of facts or events: an event or occurrence which leaves an impression on someone" (Oxford Learners Dictionary, 2012). Experience can clearly be both observation and practical contact with facts and events that can lead to the personal building of knowledge. This process is regarded by educators as learning.

Learning is explained to be the "the activity of obtaining knowledge" (Cambridge Advanced Learner's Dictionary, 2012) as well as "the acquisition of knowledge or skills through study, experience, or being taught" (Oxford Learners Dictionary, 2012). Kolb (1984) brings together these definitions when he states that "learning is the process whereby knowledge is created through the transformation of experience" (Kolb, 1984 p.38). Gagné (1985) defined learning as a "change in human disposition or capability that persists over a period of time and is not simply ascribable to processes of growth" (Gagne, 1985 p.2). Mayer (1982) proposes the following explanation.

> Learning is the relatively permanent change in a person's knowledge or behaviour due to experience. This definition has three components: (1) the duration of the change is long-term rather than short-term; (2) the locus of the change is the content and structure of knowledge in memory or the behaviour of the learner; (3) the cause of the change is the learner's experience in the environment. (Mayer, 1982 p.1040)

This definition introduces the concept of human memory and suggests that there is a process whereby knowledge that is gained through a learning experience is stored within our brains. Cognitive psychologists and neuro-scientists have extensively studied human memory and two influential explanations for this process are the schema theory (Anderson et al., 1978) and the multi-store memory model originally set forth by Atkinson and Shiffrin (1968) and developed further by Baddeley (1990) and others. The schema theory is a metaphor that describes a mental structure or framework that people use to organise and accommodate current and future knowledge while the multi-store theory refers to the capacity for the human brain to process and store knowledge information through short and long term memory.

A useful explanation combining these two memory theories is provided by Smith and Ragan (2005). They suggest that for learning to occur and knowledge to be gained, learners must firstly demonstrate 'selective perception' in which they choose to attend to the stimuli within their learning environment that are related to the learning task instruction and ignore any competing or distracting stimuli. Once learners have perceived the information, it is temporarily stored in their working memory and it is from here that the learner uses information they already know to help them understand this new information. This process of interpreting new information is where knowledge is assigned meaning and it is based on the related content knowledge, values, beliefs, and strategies that they already have available in their long-term memory. Through a process of encoding, information in long term memory is modified, added to or accommodated from where the learner may immediately or later retrieve their new learning to answer questions, solve problems or use this knowledge to understand yet more new information.

Dictionary definitions regarding meaning suggest that it is "what something expresses or represents" (Cambridge Advanced Learner's Dictionary, 2012) and it is "the thing one intends to convey" (Merriam-Webster Dictionary, 2012). Sociocultural theorists such as Wertsch (1991) have built upon the work of Vygotsky (1978) and proposed that the way learners comprehend the meaning and significance of acquired knowledge is through a process of guided participation that inducts learners into a range of culturally agreed meanings for knowledge.

Munro explains that although learning may be personal, the whole learning process is culturally determined.

> Many people think that learning has to do with processes within learners. However, the culture in which a person learns sets the agenda for learning in several ways. It determines what is learnt and influences how and when it is learnt. What and how a person learns is influenced in large measure by the culture in which the learning occurs and the social interaction processes in which the learner engages… how we make sense of the world is, in large measure, culturally determined. (Munro, 2012 p.1)

So when Wiggins proposes that "people learn by constructing their own understanding and meaning" (2009 p.2), it means that this process is mediated and influenced by cultural and social knowledge and understandings. Dictionary definitions for the word "understanding" propose that it is "the power of comprehending, the capacity to apprehend general relationships and to make experience intelligible by applying concepts and categories" (Merriam-Webster Dictionary, 2012). To understand knowledge is therefore to understand and comprehend a categorised, culturally determined meaning for an experienced event.

Zenker (2002) deepens this definition by suggesting that there are different levels to understanding, while Perkins, from Harvard Project Zero, regards understanding as existing both as a representational and a performance form. He suggests that "understanding is the ability to think and act flexibly with what one knows" (Perkins, 1998 p.40). Other educators such as Shively

(2002) regard knowledge as a tool and it is through the application and use of knowledge that learners demonstrate their understanding.

Gardner's 'theory of multiple intelligences' suggests that people do learn, represent, and utilize knowledge in many different and individualized ways. He argues that "these differences challenge educational systems that assume everyone can learn the same materials in the same way and that a uniform, universal measure can test student learning" (Gardner, 1991 p.12).

Recent post-modern perspectives of knowledge and learning contend that there is not one kind of learner, nor one particular goal for learning, nor one way in which learning takes place, nor one particular environment where learning occurs. Kilgore (2001 p.53) describes the following postmodern view of knowledge:

- Knowledge is tentative, fragmented, multifaceted and not necessarily rational.
- Knowledge is socially constructed and takes form in the eyes of the knower.
- Knowledge is contextual rather than "out there" waiting to be discovered.

This range of views regarding knowledge, experience, learning, meaning and understanding encapsulates a contemporary view of knowledge formation which has coalesced into the learning theory of Constructivism. The origins, basis and learning implications and applications of this theory will now be discussed.

1.2.2 Constructivism

Constructivism is a theory about knowledge and learning that describes what it is we 'know' and how we come to 'know' it (Fosnot, 2005). Constructivism is regarded as one of the branches of philosophy known as epistemology, a field concerned with the nature and scope of knowledge. Included in this field are Empiricism, Idealism, Rationalism and Constructivism (Smith and Ragan, 2005 p.22).

Constructivism is described by some authors as a learning theory (Gagnon and Collay, 2006); by others as an educational philosophy (Tobias and Duffy, 2009; Smith and Ragan, 2005); and by some as an ideology (Mayer, 2004). It is explained by Fosnot and Perry as a psychological theory of learning that is based upon complexity models of evolution and development. Learning is construed as an interpretive, recursive, nonlinear building process that is performed by 'active-learners', interacting with their physical and social world (Fosnot and Perry, 2005 p.35).

Since first being proposed by Piaget in 1954 (Boardman, 2002), constructivism has evolved into a complicated set of interconnected beliefs about learning that draws upon psychology, philosophy, science and biology (Webster, 2011). Constructivist conceptions of learning assume that knowledge is individually constructed and socially co-constructed by learners through an active process of interpreting what they have experienced in their world (Billett, 1996). This contrasts with other learning theories such as objectivism, by challenging the view that there is an objective or neutral 'object or truth' that can be discovered (Castello and Botella, 2006) and the positivist view that regards the only 'authentic knowledge' is that which is based on the logical and mathematical treatments of data derived from sensory experience (Macionis and Gerber, 2011). Constructivism recognises that while physical reality is independent of human thought, meaning or knowledge is always a human construction (Crotty, 1998). For education, the implications are that because knowledge is not transmitted, instruction consists of experiences that facilitate knowledge construction (Bednar et al., 1992). Von Glasersfeld suggests that "the task of the educator is not to dispense knowledge but to provide students with opportunities and incentives to build it up [knowledge]" (von Glasersfeld, 2005 p.7).

Various types of constructivism have emerged, including social, radical, cognitive and postmodern (Steffe and Gale, 1995). Research by Matthews (2000) identified 17 different kinds of constructivist theories. Many of these variations exist as a way of accommodating the entwined complexity of regarding knowledge as an individual or personal construction and knowledge being socially situated and negotiated (Ernest, 1995).

From these numerous constructivist schools of thought, there are many common themes which permit the derivation of principles, general characteristics and instructional models (Murphy, 1997). The following constructivist definition by Walker & Lambert has been applied as a working definition within music research literature by Hanley & Montgomery (2002), Scott (2006) and Webster (2011).

- Knowledge and beliefs are formed within the learner.
- Learners personally imbue experiences with meaning.
- Learning activities should cause learners to gain access to their experiences, knowledge and beliefs.
- Learning is a social activity that is enhanced by shared inquiry.

- Reflection and metacognition are essential aspects of constructing knowledge and meaning.
- Learners play an essential role in assessing their own learning.
  (Walker and Lambert, 1995 pp.17-19)

One of the key distinctions in constructivist theories is between cognitive and social constructivism. Cognitive constructivism is regarded as being based on Piaget's learning model which emphasises the interaction between the individual and their environment in constructing meaningful knowledge, whereas social constructivism, which is attributed to the work of Vygotsky, emphasises the importance of student learning through interaction with the teacher and other students (Maypole and Davies, 2001).

Although Piaget's writings span 50 years, it was research done in the final 10 to 15 years of his life that serves as a psychological basis for constructivism (Fosnot and Perry, 2005). Piaget's research proposed and developed the idea that children construct their knowledge of the world through equilibration, a constantly evolving process of assimilation, accommodation and adaption (Piaget, 1977; Piaget, 1954). When individuals assimilate knowledge, they incorporate the new experience into an already existing knowledge framework without changing that framework. This may occur when individuals' experiences are aligned with their internal representations of how they see the world, but may also occur as a failure to change a faulty or incorrect understanding. For example, they may not notice important events, misunderstand information from others, or decide that an event was a chance occurrence and therefore unimportant as information about the world. Contrasting to this, when individuals' experiences contradict their internal representations, they may change their perceptions of the experiences to fit their internal representations. Therefore, accommodation becomes the process of reframing one's mental representation of the external world to fit new experiences. It is the mechanism by which failure leads to learning: when people act on the expectation that the world operates in one way and it violates their expectations, they may often fail, but by accommodating this new experience and reframing their model of the way the world works, they learn from their own or other people's experience of failure.

Although Piaget's once popular theories regarding children's cognitive developmental stages have been challenged and usurped by more recent research (Gardner, 2008), his robust research questions have inspired other educators such as Seymour Papert and his theory of Constructionism (Papert and Harel, 1991). This is discussed in greater detail in section 4.3.1 (p.326).

Another influential figure upon the formation of Constructivist learning theories was the Russian, Lev Vygotsky. His theories stress the fundamental role of social interaction in the development of cognition. Although his research was incomplete at the time of his death in 1934, a translated compilation of his key theories was published some 44 years later in the book 'Mind in Society' (Vygotsky, 1978). Two influential principles of his work were the role of the 'more knowledgeable other' and the 'Zone of Proximal Development'. The 'more knowledgeable other' can be defined as someone with a better understanding or at higher ability level than the learner with regard to the particular learning task, process, or concept. The Zone of Proximal Development is the achievement difference between what the learner can achieve through independent learning and what they can achieve through guided learning from a 'more knowledgeable other'. His research places more emphasis on culture, social factors and language in the cognitive development of children compared to Piaget (McLeod, 2007).

Vygotsky's theories have found resonance and influenced the work of: Wertsch's Socialcultural theories (1991); the Social Learning theories of Bandura (1977); as well as being a key component of Lave's (1990) Situated Learning Theory.

The American psychologist Jerome Bruner is another influential figure in the formation of constructivist learning theories. Bruner directly influenced educational programs in the United States during the 1960s and 1970s by promoting discovery learning, instructional scaffolding and the spiral curriculum. According to Bruner (1979 p.122), the goal of education is 'disciplined understanding' and this should occur through an active learning process where new ideas are constructed based on existing knowledge (Bruner, 1966).

For Bruner, designing instruction to promote learning should involve students in an active discovery learning process that is readily applicable. Bruner (1961 p.26) states that "Practice in discovering for oneself teaches one to acquire information in a way that makes that information more readily viable in problem solving". In addition, Bruner (1966) suggests that there are four components essential to instruction: 1) predisposition of the student towards learning; 2) the intended learning should be structured such that it is readily grasped by the learner; 3) the sequence of presentation must be effective; and 4) rewards and punishments must be of an acceptable nature and paced correctly.

Another important contribution was Bruner's spiral curriculum theory. It was formed around the idea that human cognition evolves in a step-by-step learning process relying upon environmental interaction and experience to form intuition and knowledge; best learnt through a process of repeated experience of a concept.

Bruner continued to develop his views on education, shifting from regarding learning as an individualized process of achievement, to a view that learning is a communal, social and 'intersubjective' process (Takaya, 2008). Bruner considers that education tends to work well when learning is, first, participatory, proactive, communal, and collaborative; and second, when learning is a process of constructing meaning rather than receiving (Bruner, 1996 p.84).

Constructivism in Education

During the past 40 years constructivist theories of learning have made a profound impact upon approaches to general education, particularly in the fields of Science and Mathematics (Kaufman, 2004). Over the last two decades, constructivism has emerged as a dominant paradigm in education, influencing the development of pedagogy and playing a major role in systemic changes (Brooks, 2002; Wang and Walberg, 2001).

Constructivism has refocussed instruction and learning upon the learner's individual development and has affirmed the critical role in the learning process of endogenous (internal) factors and internal schema combined with the exogenous (external) social and cultural factors; all of which contribute to the transformation of the learner's internal knowledge schema (Cole, 1990).

Kaufman (2004) suggests that the common misconception that constructivist learning emerges only from learners' knowledge without direct instruction from teachers is refuted when learning is considered from a dual perspective of internal and external variables and Piagetian and Vygotskian perspectives. He explains that:

> Learners benefit from multiplicity of approaches and learning experiences as they extract salient information in acquiring new knowledge. They also benefit from assistance by teachers who attend to their interpretations and provide relevant guidance and scaffolding to promote meaningful learning. The constructivist experience from both Piagetian and Vygotskian perspectives creates opportunities for learners to engage in hands-on, minds-on manipulation of raw data in a quest of identifying new and increasingly complex patterns, acquisition of novel concepts and construction of new understandings. (Kaufman, 2004 p.305)

For educators such as von Glasersfeld, it is the theoretical underpinning provided by constructivist theories that is important:

> Constructivism does not claim to have made earth-shaking inventions in the area of education; it merely claims to provide a solid conceptual basis for some of the things that, until now, inspired teachers had to do without theoretical foundation.
> (von Glasersfeld, 1995 p.X)

Constructivism provides a way of looking at the world that is broad enough to allow for multiple interpretations, yet sufficiently defined to explain complex and abstract phenomenon that in turn can guide our actions in teaching (Murphy, 1997). Barraket (2005) suggests that the principal implication of constructivist understandings is that students become the key initiators and architects of their own learning and knowledge-making, rather than passive receivers of knowledge from ‘expert' teachers. Expanding upon this implication, Fosnot states:

> Although constructivism is not a theory of teaching, it suggests taking a radically different approach to instruction from that used in most schools. Teachers who base their practice on constructivism reject the notions that meaning can be passed on to learners via symbols and transmission, that learners can incorporate exact copies of teachers' understanding for their own use, that whole concepts can be broken into discrete subskills, and that concepts can be taught out of context, In contrast, a constructivist view of learning suggests an approach to teaching that gives learners the opportunity for concrete, contextually meaningful experience through which they can search for patterns: raise questions; and model, interpret, and defend their strategies and ideas. (Fosnot, 2005 p.IX)

Webster (2011) considers that music education has traditionally been dominated by directed instruction that is top-down in nature, with little consideration for student constructed knowledge. He suggests that it is only in the last ten to fifteen years that writers in music education have begun to consider seriously the practice of music teaching and learning from a more constructivist perspective.

Student Centred Learning – Child Centred Learning

The theoretical basis for student-centred learning is primarily derived from a constructivist view of learning (Lee and Teo, 2007; O'Neill and McMahon, 2005), with importance placed upon activity, discovery and independent learning (Carlile and Jordan, 2005). It has emerged as viable pedagogy within the teaching professions because of a changed understanding towards the nature of knowledge and learning influenced by constructivism (Barraket, 2005). Although constructivism encompasses a broad array of understandings, the common thread running through this theory of learning is the value placed on student-centred learning (Maypole and Davies, 2001).

Student-centred learning and teaching has been defined as a process by which students are given greater autonomy and control over the choice of subject matter, the pace of learning, and the learning methods used (Gibbs, 1992). Student-centred learning had been acknowledged as early as 1905 according to Hayward and through the research and writings of Dewey (O'Sullivan, 2004). Carl Rogers is associated with broadening this approach into a general theory of education (Burnard, 1999; Rogoff, 1999). Rogers (1983) described the shift in power toward the student learner as a need for change within the traditional environment because within this "so-called educational atmosphere, students become passive, apathetic and bored" (Rogers, 1983p.25).

The paradigm shift away from teaching to a renewed emphasis on learning has also encouraged a shift in the power base from the teacher to the student (Barr and Tagg, 1995). A summary of the literature on student-centred learning by Lea, Stephenson and Troy identified the following characteristics:

- The reliance on active rather than passive learning.
- An emphasis on deep learning and understanding.
- Increased sense of autonomy in the learner.
- An interdependence between teacher and learner.
- Mutual respect within the learner teacher relationship.
- A reflexive approach to the teaching and learning process on the part of both teacher and learner. (Lea et al., 2003 p.232)

Other authors such as Gibbs (1995) added the idea that the learner activity was about process and competence rather than content and that key decisions about learning are made by the student, following negotiation with the teacher.

The student-teacher relationship is explored more fully by Brandes and Ginnis (1986 pp.12-15). They present the main principles of student centred learning as:

- The learner has full responsibility for her/his learning.
- Involvement and participation are necessary for learning.
- The relationship between learners is more equal, promoting growth and development.
- The teacher becomes a facilitator and resource person.

- The learner experiences confluence in their education (affective and cognitive domains flow together).
- The learner sees themselves differently as a result of the learning experience.

A student-centred pedagogy requires students to set their own goals for learning, and determine resources and activities that can help them meet those goals (Jonassen, 2000). It is presumed that as students are pursuing their own goals, students will be motivated and regard their activities as personally meaningful.

Jonassen (1999) claims that a variety of pedagogical approaches are associated with student-centred learning including case-based learning, goal-based learning, problem-based learning and project-based learning, all of which have a common 'central question' that creates a need or purpose for certain knowledge and activities. The learning is the result of student efforts to develop a response to the 'central question'. This can take a variety of forms such as, a solution, an opinion, a design or a product (Pedersen and Liu, 2003).

Cuban (1983) argued that although interest in student-centred learning had spanned much of the 20th century, by the early 1980s it had still largely failed to take root in schools. Cuban speculated that school and classroom organizational structures, as well as teachers' own experiences as students, created conditions that perpetuated traditional teacher-directed instruction (Cuban, 1982). Some 20 years later, Windschitl (2002) expanded upon this view and suggested that efforts to implement constructivist influenced teaching practices in schools have met with conceptual, pedagogical, cultural and political challenges that make transforming teacher directed instruction to student-centred learning practices difficult.

Criticism of Constructivist Influenced Pedagogies

Educators such as Rowe (2007), Hattie (2009) and Mayer (2004) warn that although pedagogies framed upon constructivist learning theories are appealing, research demonstrates that they are not as efficient or effective as the more traditional directed approaches. Wilson (2005a), highlights what he believes is the inappropriateness of constructivism as an operational theory for teaching:

> Australian operational views of constructivism … confuse a theory of knowing with a theory of teaching. We confuse the need for the child to construct their own knowledge with a form of pedagogy which sees it as the child's responsibility to achieve that. We focus on the action of the student in the construction of knowledge rather than the action of the teacher in engaging with the child's current misconceptions and structuring experiences to challenge those misconceptions. … The constructivist

> theory of knowing has been used to justify a non-interventionist theory of pedagogy, whereas it is a fair interpretation to argue that constructivism requires vigorous interventionist teaching: how, after all, is a student with misconceptions supposed to challenge them unaided? How do they even know they are misconceptions? (Wilson, 2005b p.2-3)

Hattie (2009) suggests that it is the teacher's implementation of constructivist-influenced pedagogies, not the constructivist learning theories themselves that must be addressed. He suggests a teaching model based upon his research that combines, rather than contrasts, student-centred knowledge construction with teacher-centred teaching:

> Teachers need to be actively engaged in, and passionate about, teaching and learning. They need to be aware of, and update their conceptions and expectations of students, and be directive, influential, and visible to students in their teaching. Teachers need to provide students with *multiple* opportunities and alternatives for developing learning strategies based on the surface and deep levels of learning leading to students building constructions of this learning. What is required are teachers who are aware of what individual students are thinking and knowing, who can construct meaning and meaningful experiences in light of this knowledge, and who have proficient knowledge and understanding of what progression means in their content to provide meaningful and appropriate feedback. (Hattie, 2009 p.36)

Although the term "constructivist-based" teaching practice is commonly used by educators, Fosnot (2005) questions whether there is such a thing. Fosnot considers that "constructivism is not a theory of teaching; it is a theory about learning" (p.279), and contends that many educators confuse the use of 'reform-based' teaching strategies with constructivist learning theories.

Corry (1996) claims that constructivism works well with motivated, high achieving students, but not as well with less motivated students who have trouble grasping things quickly and experience difficulty in working with others. Others suggest that the approach works best with students from privileged backgrounds who already possess essential skills and school-oriented attitudes and behaviours (Johnston, 2005; Delpit, 1996).

1.2.3 Context: The Secondary School Music Curriculum

Constructivist learning theories and sociocultural perspectives have influenced many recent curriculum reforms in Australian schools. Within South Australian secondary schools, curriculum frameworks such as the South Australian Curriculum Standards and Accountability Framework (SACSA) and the South Australian Teaching for Effective Learning - Framework Guide (DECS, 2010), emphasise constructivist learning theories and pedagogies that promote student knowledge construction rather than 'transmission'.

In a review of the implementation of SACSA, constructivist theoretical underpinning was identified as one of the eight major characteristics and intentions of the SACSA Framework:

> A focus on outcomes in the South Australian public education system means being explicit about what we expect learners to know, understand and be able to do as a result of their participation in teaching and learning programs based on an agreed curriculum framework. The dual focus on constructivism and outcomes is deliberate. It takes some of the uncertainty and the potential lack of rigour and inequitous provision out of the pure constructivist pathway. The explicit identification of intended outcomes gives the community and learners information about what we value as professionals. (Stehn, 1999 p.6)

Defining Curriculum

There are various definitions that researchers have applied to the term curriculum. Foshay (2000 p.XV) states that curriculum is "a plan for action by students and teachers" that requires clarity of goals, content, and practice. Wing (1992) views curriculum as the point of mediation between an idea of education and practice while Hanley (2002 p.113) summarises that most definitions are directed towards classroom practice.

The former Chief Executive of the Department of Education, Training and Employment in South Australia, Geoff Spring, provided an inclusive definition by stating, "… curriculum is the sum total of all teaching and learning activities in our schools..." (DETE, 2001 p.3) A broad definition of Music Curriculum could therefore be 'the sum total of all music teaching and music learning activities in schools.' Although this definition is very appealing it is perhaps an oversimplification of a complex construct.

Jorgensen (2002) states that "traditionally, curriculum refers to the subject matter or content of instruction, that is taught by teachers, or the raison d'etre and focus of the student and teacher pedagogical interaction" (p.50). In addition, Jorgensen warns that a singular view of curriculum is flawed or limited and that notions of curriculum as content of instruction, system, process, realm of meaning, application of reason, and discourse are all useful for different purposes and yet are also problematic if considered alone (p.57).

Other researchers argue that school subjects are not value-free or neutral and that they are social and political constructions (Goodson et al., 1998; Goodson and Marsh, 1996; Popkewitz, 1987). When knowledge is selected, organized, and transformed into a school subject, the resulting curriculum reflects power relations that are closely aligned to the process of social reproduction (Bernstein, 1971; Young, 1971). This perspective suggests that framing school subjects around academic disciplines contributes to the reproduction of the existing social order and the perpetuation of the values of the dominant social class interests (Apple, 1995).

In the view of Colwell (1990), curriculum in music education has been developed more on the basis of tradition and rigorous evaluation than on systematic research. Plummeridge (2002) expands this idea by indicating that teaching practices in schools are determined by a complex mixture of values, traditions and methodologies, as well as very important practical organizational factors which include accommodation, timetabling, staffing and resources.

Philosophical Foundations For Music Education Within Schools

The purpose or reason for the inclusion of music education within the school curriculum has been discussed from a range of philosophical views. Swanwick and Taylor suggest that:

> If we can accept that the main objective of all music education is to enable people to appreciate music, that is to value music as a life-enhancing experience, then we have not only the best possible basis on which to build a curriculum but also the only really satisfactory justification for music education that exists.
> (Swanwick and Taylor, 1982 p.6)

According to Morford (2007 p.75), two important historical influences upon the philosophy of music education during the late 20th century were the aesthetic and praxial philosophies. The aesthetic philosophy was promoted most notably through the writings of Bennet Reimer during the 1970s and 1980s. It suggested that the primary goal of music education was to develop people's emotional "responsiveness to the power of the art of music," and any non-artistic functions of the music were secondary (Reimer, 1989).

A significant reaction to this aesthetic philosophy occurred during the 1990s with the introduction of the praxial philosophy of music education championed by David Elliott's (1995) book *Music Matters*. Elliott advocates a philosophical foundation for a new approach to music education that is centred on music as an intentional human activity - the act of 'musicing' as a human propensity in opposition to 'music as object'; emphasising the importance of music is in doing rather than responding. Elliott links 'musicing' with a common set of life values where self-growth, self-knowledge, self-esteem and happiness-for-oneself and others, for example, give music a core place in the school curriculum. His emphasis on 'musicing' highlights the importance of the practical doing and placing music in its practical context.

The focussed concentration periods referred to as 'flow' experiences (Csikszentmihalyi, 1990) seem a not too distant correlation of authentic self-expression suggested by the Expressivist movement. Finney (1999) describes Expressivism as a process of clarifying, articulating and understanding our felt experience, an experience that is often incoherent and undefined. He suggests that we may not produce works of art, but we do behave artistically, if we engage in this process of knowing or giving form to our feelings. Finney considers that musical expression is one of many types of expressive acts that mark out life as being real and worth living.

Colwell states that "all curriculum construction in music education must seriously consider providing experiences that lead to cultural knowledge and an understanding of music's contribution to civilization" (Colwell, 2011 p.92). Colwell claims that there is a general acceptance that a viable music curri culum must be constructed for each school situation and that decisions as to what and how to teach are affected by a complex set of factors such as resources, tradition, culture, teacher preference, and teacher skills, as well as the "whims" of parents and school administrators.

Justifications for Music in the School Curriculum

Current justifications for music in the school curriculum often centre on the conception of education and the development of categories of thought through different modes of experience. People construct meanings and understandings from experiences, and these become knowledge. A liberal education, which is arguably encouraged in a democratic society, provides learning experiences through a range of designed learning contexts. This is best identified or encapsulated in the phrase 'broad and balanced' curriculum.

A scientific and neurological justification for music in the school curriculum is provided by Gardner's (1983) Multiple Intelligences Theory. He argues that people have a number of intelligences with music being one of these. Gardner's argument for the existence of musical intelligence hinges on the ability for an individual to display ‘musical’ competencies, despite other neural injuries, to linguistic, numerical or spatial reasoning.

Any particular justification will have a bearing on how music as a subject is conceived, presented and taught to pupils in schools. Plummeridge (2002) suggests that trends in music teaching are informed, either implicitly or explicitly, by particular ideas regarding the value and aims of musical studies as a whole. Research projects that demonstrate the transferability of student skills and aptitudes to other school subjects also support a justification for Music in the school curriculum.

Catterall, Capleau and Iwanaga (1999) analysed data from 25,000 students from Year 8 to Year 12. Their findings revealed that those students involved in arts-related courses in or out of school, and those involved in extracurricular arts activities at school, performed better than ‘low-arts students’ on every measure reported. The effects were more significant for students of low than high socio-economic background. They then investigated the relationship between training in instrumental music and mathematics. They found that students with high involvement in instrumental music from middle school onwards did better than the average student in Year 12 mathematics. This result is consistent with the findings of an Australian study by Bahr (1997). The results for music indicated that independent of socio-economic background there was an increasing advantage to those students heavily involved in music as they progressed through school.

Bearing in mind the results of these studies, it is not unexpected that an Australian Council for Educational Research report evaluating school based arts programmes claims that “the evidence for transfer to academic subjects seems most convincing for music, particularly when musical notation forms part of the programme…” (Bryce et al., 2004 p.8).

Tempering these positive results are Harland et al (2000), who reviewed British arts education and its effectiveness and found that although students and staff at the selected case-study schools believed that school arts programmes had positive effects on achievement in other subjects, analysis of survey and test scores did not corroborate this.

Curriculum Content

Doyle (1992) identified that discussions about curriculum and curriculum content can be seen occurring at two distinct levels of schooling, namely at institutional level and at the classroom level. The Institutional level includes two sub levels, a *policy level* relating to schooling, culture and society and the *programmatic level,* that is about the structural aspects of content specification and timetabling. The classroom level is where the programmatic curriculum is elaborated and then connected to the worlds of ‘real students’ and events of the classroom.

Westbury (2002) identifies that it is important to understand the relationship between the curriculum and its school, social, and cultural environments. Westbury proposes that parents and students always use the school for their own ends and their actions are also related to the cultural reproduction of economic and social values. In a similar vein, Vulliamy (1977) claims that schools are not socially neutral, meritocratic institutions that are accessible to all who have appropriate ability. Vulliamy observed the English Grammar school system and found that there were a host of taken-for-granted cultural assumptions about what counted as 'good' music and what was an appropriate response to such music:

> [There was] an unexamined emphasis on musical 'literacy' rather than 'sounds' converting music into a cultural discipline rather than a creative activity. This embedding of musical literacy in an honoured tradition of listening to 'serious' music also excluded many students from active engagement with music and many students became discipline problems in the music classroom as a result of their non-responsiveness to the 'legitimate' classroom activities. (Westbury, 2002 p.149)

Swanwick (1993) built upon the idea of the embedded 'hidden curriculum' and identifies Bernstein's (1971) classification and framing principles to emphasise that schools and colleges make decisions as to what music is included or excluded and how teaching and learning are to be managed. Examples of classification and framing within a school music curriculum are performance ensembles, such as bands and choirs, which require strong classification in terms of repertoire and strong framing in terms of rehearsal structures, all of which can work against personal internalization of appreciation and understanding (Swanwick, 1993). The teacher's efforts to make music 'relevant' to students results in the selection of "popular" music that is 'fitted' to the school. The context of the music is no longer in the original cultural style, resulting in abstracted analysis, whereby impact volume levels may be reduced, dancing can be impractical and usual student 'social behaviours' may be tempered (Westbury, 2002). These research findings highlight factors that are embedded in music curriculums and indicate that they will have an influence upon the type of knowledge students will form from their secondary school music experience.

Development towards an Australian Music Curriculum

Australia does not currently have a national school system and constitutional responsibility for schooling is distributed to state and territory governments (Crawford, 2009a). Through the Department of Education, Employment and Workplace Relations (DEEWR) the Commonwealth government works cooperatively with the states and territories as well as the non-government and Catholic school sector to pursue national educational goals that "focus on the learning outcomes of students and provide a framework for national reporting on student achievement and for public accountability by school education authorities" (Department of Education Science and Training, 2003 chapter 5).

The Ministerial Council for Education, Early Childhood Development and Youth Affairs (MCEECDYA) coordinates strategic policy development and delivery of educational programmes and services. It is the body that proposed the Australian Curriculum for all school subject areas, foundation to year 10 levels, following their 2008 Melbourne Declaration on Educational Goals for Young Australians (MCEEDCDYA, 2008). This document outlined a broad vision for schooling, learning, curriculum, assessment and accountability.

Progress towards an Australian Arts Curriculum commenced in 2010 in which Music was incorporated as part of a second phase of subjects developed towards the Australian Curriculum by the Australian Curriculum Assessment and Reporting Authority (ACARA). Following a consultative process to determine the Arts curriculum 'shaping' of terminology and structures in 2010-2011, a draft curriculum document for the Arts incorporating Music has been published and a final form of the curriculum is proposed for early 2013 (ACARA, 2012).

South Australian Secondary School System

South Australian secondary schools are divided into three schooling systems; Government, Catholic and Independent schools. Currently, Government and Catholic secondary schools base their curriculum upon the South Australian Curriculum Standards and Accountability Frameworks (SACSA). Independent schools have their own curriculums approved through a State Government process of school registration. The senior years of schooling (Year 10, 11 and 12) are focussed towards the South Australian Certificate of Education (SACE). Additional external curriculums include the International Baccalaureate (IB) Middle Years and Diploma Programs as well as Vocational Education Training (VET) courses in some schools. Secondary schools generally provide five years of progressive schooling identified as year 8 to year 12 with student ages ranging from 13-18 years. Variations on this model also exist with the term Middle Schooling sometimes including year 6 or 7 students who are approximately 11-12 years of age.

South Australian Secondary School Music Curriculum 2013

Although there is not one definitive secondary school music curriculum model in South Australia, there are many commonalities that are shared across schooling systems and geographical contexts. The researcher's personal experience as a SACE examiner and educator has informed the following summary.

A 'typical' South Australian secondary school music curriculum is generally structured around a lower secondary curriculum (years 7/8-9-10) and upper secondary curriculum (years 10-11-12). The lower secondary curriculum is generally organised using the SACSA Framework Arts Learning area structures (DECS, 2005; DETE, 2001) while the upper secondary curriculum is focussed towards the SACE Stage 1 (year 11) and Stage 2 (year 12) curriculum documents (SACE, 2012).

The lower secondary curriculum 'typically' features an initial term or semester based 'music experience' program during the first year followed by an 'elective' option for further studies in the subsequent lower secondary years. Influential examples of curriculum planning, programming and assessing for lower secondary school music curriculums are provided in documents such as the R-10 Arts Teaching Resource (DECS, 2004). This document demonstrates how music learning experiences framed around instrumental and vocal music making, composing, listening, analysis and research into cultural music practices can be represented through the SACSA language of Essential Learnings, Key Competencies and Learning Outcomes. Year 10 may continue this curriculum model or may include some SACE Stage 1 studies.

The SACE Stage 1 curriculum allows schools to develop their own Learning and Assessment Plans with reference to six Learning Requirements with the intention of preparing a pathway towards SACE Stage 2 music studies. The SACE Board explains the SACE Stage 1 curriculum in the following way:

> This subject outline does not prescribe the specific content of school programs. However, school programs (either Music Experience Programs or Music Advanced Programs) are expected to involve a selection of learning activities that relate to the relevant musical studies. (SACE, 2012 p.9)

The content that schools develop for SACE Stage 1 generally addresses preparatory knowledge and skills required for SACE Stage 2 music subjects. Assessment for SACE Stage 1 is school based with reference to a Performance Standards rubric addressing Practical Application, Knowledge and Understanding and Analysis and Reflection with the level of learning explained in A to E grades.

In SACE Stage 2, students select one or more units from eight music subject options from which two or four are combined to form a full music subject. The requirements for each of these subject options are detailed and addresses specific Learning Requirements. Assessment includes school moderated assessment and external examination using subject specific Performance Standards rubrics with the level of learning explained in A to E grades. These grades contribute towards a student's SACE schooling certificate or their Australian Tertiary Admission Rank (ATAR).

The 'typical' South Australian music curriculum described above does not include other possible options that exist through: public school special interest music centres, independent school curriculums, IB or VET programs. The robustness of both the SACSA and SACE curriculum framing structures have allowed South Australian secondary schools scope for curriculum interpretation and customisation to suit their contexts and students' musical interests.

1.2.4 Musical Understanding

Defining what musical understanding is and how it can be represented has challenged 21st Century music educators (Hanley and Goolsby, 2002). Zenker (2002) suggests that musical understanding is less a definition and more about a capacity to comprehend and connect our musical experiences. Zenker explored the dynamic and complex nature of musical understanding and concluded that there was no single type of 'music-understanding-know-how' waiting to be grasped. She considered that it was constructed and created by each individual according to his/her personal experiences with music: playing, singing, listening, composing, performing, improvising, reading music and learning musical concepts. Zenker identified musical understanding as polymorphous, in that individuals pass through many different stages and levels of musical understanding depending on the musical context. The ability to make connections and recognise relationships among musical activities is regarded as one representation of musical understanding, which also becomes the foundation and basis for music appreciation. This definition of musical understanding suggests a constructivist perspective that is both individual and social. Musical concepts are regarded by Zenker as ideas that help us talk about music, specifically 'elements' such as rhythm, harmony and melody. Zenker suggests that an individual's lack of knowledge of these terms does not preclude the development of more sophisticated levels of understanding:

> We do not need explicit knowledge of concepts to understand music in the sense of "knowing how to follow" the music. Although we may be unaware of it, however, we may initially develop concepts, often without explicit musical words, by experiencing

> the music we hear around us in our particular culture. It is important for educators to make students aware of their “perception recipes” or their “intuitive/organic apparatuses,” which we can consider to be different terms for the same thing [prior knowledge and understandings], to prepare them for more sophisticated levels of understanding. (Zenker, 2002 p.39)

A cognitivist and socio-cultural viewpoint is provided by Fiske and Royal (2002) who propose that musical understanding is a hypothetical construct used to describe mental behaviour which may be explained by genetically determined brain processes, as well as by influences and choices brought about by cultural contexts.

Bartel (2002) considers that music learning is integral to music understanding and that the development of musical understanding is concerned with increasing the complexity of the constructs. This includes developing associations among constructs; the complexity of explanatory constructs; as well as the accuracy of explanatory constructs to anticipate and predict patterns. Bartel proposes that to develop musical understanding:

> … music education must foster engagement, involve students in a constructivist manner with musical materials and problems, and encourage links with multiple intelligences and multiple representations through metaphor, cross-modality, and inter-disciplinary and integrated art experiences. (Bartel, 2002 p.69)

According to Goolsby (2002), musical understanding draws upon an amalgamation of three recognized taxonomies: Bloom’s Taxonomy of Cognitive Knowledge; Krathwohl’s Taxonomy for the Affective Domain; and Harrrow’s Taxonomy of the Psychomotor Domain. Goolsby believes that music is an “ill-structured domain” (Spiro et al., 1995) which also includes non-traditional types of knowledge such as intuition and perception (Goolsby, 2002 p.4).

Hanley and Montgomery’s (2002) emphasis on teaching for musical understanding echoes and resonates with other learning research projects such as Harvard’s Project Zero (Gardner and Perkins, 1988) and Arts PROPEL (Davidson et al., 1992), as well as the performance of understanding pedagogy model proposed by the Harvard University’s Teaching for Understanding framework (Wiske, 1998). Although developing musical understanding was not the focus of these projects, the learning literature and pedagogy that were developed have challenged some music educators to consider new ‘generative’ approaches to music education (Hanley and Montgomery, 2002; Poelman, 2002).

Research by Swanwick and Franca (1999) explored representations of musical understanding through analysing the composing, performing and audience-listening of twenty Brazilian children. Their findings suggested that musical understanding lies within the cognitive structures developed from the different modalities of musical engagement. They proposed that the quality or depth of musical thinking/cognition that is manifested in one specific musical activity (e.g. composition) may not be consistently revealed across all musical activities (e.g. performing and aural perception). They suggested that an integrated music curriculum that includes composing, performing and audience listening, at skill levels appropriate for the learner, is more likely to produce musical understanding.

In 2001, Wiggins proposed, in her seminal book 'Teaching for Musical Understanding', that the ultimate goal of music learning is for learners to understand what they are learning and to be able to apply their musical learning to a multitude of new situations with a degree of autonomy. She states:

> Music learning should empower learners with musical understanding so that they can become musically proficient and eventually musically independent of the teachers. (Wiggins, 2009 p.45)

Wiggins thoughtfully presents a constructivist perspective towards learning, discussing and demonstrating a range of student-centred approaches that includes problem-solving and cooperative learning strategies. These are applied within creative composition-based projects using a 'Prepare, Plan and Engage' framework that Wiggins suggests is suitable for early primary through to secondary age school students.

Music educators however, do not all share the same regard for knowledge construction and understanding. For example, Webster (2011) noted:

> How music teachers think about the manner that understanding is formed or constructed by their students varies enormously. Some are likely to not think much at all about this, assuming learning happens as a result of teacher-centred content and evidence of learning in the form of performances or exams. Others may be more diverse in their approach – allowing for more student-centred content and varied assessment strategies in hopes of encouraging perhaps a deeper and more lasting level of constructed musical understanding. (Webster, 2011 p.35)

For Webster and other educators (Wiggins, 2009; Morford, 2007; Scott, 2006; Broomhead, 2005; Shively, 2002), the late 20th Century advances in understanding about how people learn suggest that the learning theory and pedagogical implications of constructivism may become a source of fresh practices in music education during the 21st Century. Hanley and Montgomery (2005) explored a reconceptualised approach to music education reflecting postmodernist influences that result in a paradigm shift from a traditional "positivist" curriculum model towards a reconceptualised constructivist influenced curriculum. Their discussion raised the following questions:

> Should music education be teacher centered, subject centred, or learner centered? Should we focus on skill development or the development of musical understanding? Should we emphasize musical learning or cross curriculum connections? Should we be trying to improve our students' musical tastes of welcoming the diverse kinds of music relevant in their lives? Whose interests should guide decision making? What is really going on in schools? (Hanley and Montgomery, 2005 p.18)

In reviewing a range of constructivist influenced music learning research, Webster (2011) notes that what seems lacking in most writing regarding constructivist teaching practices is a critical perspective on how well these practices actually work. A range of constructivist music research was identified by Webster (2011) and selected examples will be discussed later within the literature reviews of each folio topic.

1.3 Designing Musical Learning Experiences

Wiggins (2009) and Scott (2006) have urged music teachers to create deeper musical understanding through designed learning experiences using constructivist influenced pedagogies. Wiggins and Scott both identify instructional planning as an important process for creating learning experiences that support student knowledge construction while also providing opportunities for students to achieve deeper musical understanding. This chapter will propose a definition for what a musical learning experience is by drawing upon instructional design theories, experiential learning models, and constructivist influenced learning models and frameworks.

1.3.1 Designing Learning and Instructional Design

Planning for learning is a common theme in educational literature (Reeves, 2011; Brunn, 2010) as are improving the 'planning for learning' process (Carr and Harris, 2009; Martin-Kniep and Picone-Zocchia, 2009), and the notion of designing learning (Nelson, 2012; Marzano, 2009; Allen, 2007). The educational distinction between 'planning' and 'designing' may appear to be subtle, but it is arguably important. According to Smith and Ragan (2005 p.6), design is an activity or process intended to improve the quality of an intended outcome. They identify that design is related to planning, but the difference is in the level of expertise and care required for more complex and detailed outcomes. They suggest that design implies a higher level of care and sophistication, in addition to specialized knowledge and skill. For educators intending to improve the quality of student learning, the idea of 'designing' learning seems a more appropriate term than 'planning'.

The process of designing learning from a teacher's perspective has been well documented within the field of Instructional Design (ID). ID is a branch of knowledge that is concerned with the research and theory about instructional strategies and the processes for developing and implementing those strategies (Berger and Kam, 1996). Proposed design models suggest a systematic and reflective process for translating principles of learning and instruction into plans for instructional materials, activities, information resources and evaluation (Smith and Ragan, 2005). Reigeluth (1999) explains ID theory as "explicit guidance on how to better help people learn and develop" (p.5). He identifies the following four major characteristics that all ID theories have in common:

- *Design Oriented –* focussing upon means to attain the learning or the development goals (as opposed to description oriented which focuses on the results of given events).
- *Methods* of instruction are identified that support and facilitate learning, as well as descriptions of the *situations or contexts* that are most appropriate for this method.
- *Component Methods,* that are more detailed and specific, can be drawn up from each method.
- *Probabilistic* rather than deterministic in that they increase the chances of attaining the learning or development goals, rather than ensuring the attainment of these goals. (Reigeluth, 1999 p.6)

A number of researchers have published articles that outline and explain the historical development of Instructional Design (Reiser, 2001b; Reiser, 2001a; Leigh, 1998; Shrock, 1991; Reiser, 1987; Saettler, 1968). An important component of ID is the process design model. It is a visualized depiction of the ID process and diagrammatically emphasizes the main elements and their relationship (Smith and Ragan, 2005). Many ID models have been proposed during the past half century with over 60 identified by Andrews and Goodson (1995) and over 200 model descriptions published in educational technology literature (Willis, 2009a). The vast majority of these ID models are based on behavioural and information processing theories of learning and many are modifications and elaborations of the basic problem solving model which includes Analysis, Strategy, Development, and Evaluation (Dick and Carey, 1996).

During the 1990s, Instructional Designers were challenged by the dominant learning theory of constructivism (Karagiorgi and Symeou, 2005). Criticism of the behaviouristic based Instructional Design models emerged with several authors suggesting that ID could and should be based on theories of learning other than behaviourism or information processing. Constructivism started with a different set of assumptions about learning and suggested new instructional principles that were revolutionary and which replaced rather than added to the understanding of learning upon which instructional design had been built (Bednar et al., 1992). Objectivism and constructivism were often conveyed as incompatible and mutually exclusive ID approaches during the 1990s (Jonassen, 1999 p.217).

The 21st Century has seen the study of learning being increasingly influenced by constructivism and social theories (Jonassen et al., 2005). For instructional design, this has resulted in a more pragmatic, moderate and inclusive view of instructional approaches, with the incorporation of diversity of perspectives and methods as important aspects of a new paradigm of instructional design (Reigeluth, 1999). All instructional processes are now regarded as tools to aid in the construction of learner knowledge (Jonassen, 1999 p.217). This significant compromise has allowed ID theories to evolve from a highly structured systems approach to one that can accommodate the flexibility necessary for a complex post-modern view of learners and the systems within which they learn.

Instructional strategies now embrace a range of theories such as: direct approach (Huitt et al., 2009); discussion approach (Gibson, 2009); experiential approach (Lindsey and Berger, 2009); problem-based approach (Savery, 2009); and simulation approach (Gibbons et al., 2009). Another divergence from traditional ID models was explored by Grabinger (2007). He proposed a socio-cultural framework model that emphasized learning from experience and discourse while focusing upon developing 21st century learning skills, such as critical thinking, problem solving, research and lifelong learning.

1.3.2 Learning Experiences

Two important figures who promote an experiential basis for learning and teaching are John Dewey and David Kolb. Dewey's book, *Experience and Education* (Dewey, 1938), illuminates many factors as foundation stones in models of constructivist influenced pedagogy which continue to resonate into the 21st century. Kolb and Fry (1975) drew upon the work of Dewey and Piaget and developed an Experiential Learning Theory and learning model that outlines important elements for structuring and designing learning experiences.

Dewey and Learning Experiences

Dewey believed a good education should have societal purpose as well as purpose for the individual, and that educators should first understand the nature of human experience and recognise that no experience has pre-ordained value. Thus, what may be a rewarding experience for one person could be detrimental for another. The value of the experience should be judged by the effect that that experience has on the individual's present, their future, and the extent to which the individual is able to contribute to society.

Dewey proposed that experience and education cannot be directly equated to each other and warned that certain experiences can be 'miseducative' and have the effect of arresting or distorting the growth of further experience. They may also become disconnected from one another; though each may be enjoyable, of interest and of value in themselves, they may not provide links to future growth and development. He recognised the central problem of an education based upon experience was to select the kind of present experiences that "live fruitfully and creatively in subsequent experiences" or, to phrase it another way, to discriminate between experiences that are worthwhile educationally and those that are not.

Dewey identified two principles that emerge from educational experiences: continuity and interaction. Continuity is how each personal experience influences their future, for better or for worse, and interaction is the situational influence upon present experience, with our perceptions of the present experience being a function of the interaction between our past experiences and the present situation. He noted that it is the quality of the present experience that will influence the way in which the principles of continuity and interaction apply.

For Dewey, teachers have a responsibility as possessors of 'greater maturity of experience' to be directive in planning and monitoring the direction that the students' experience is heading. Teachers must use their educational judgement to be directive in creating these experiences:

> A primary responsibility of educators is that they not only be aware of the general principle of the shaping of actual experience by environing conditions, but that they also recognize in the concrete what surroundings are conducive to having experiences that lead to growth. Above all, they should know how to utilize the surrounding, physical and social, that exist so as to extract from them all that they have to contribute to building up experiences that are worthwhile. (Dewey, 1938 p.35)

The educative significance and value of an experience is measured by the active union of the principles of continuity and interaction. For the educator, this means choosing or designing the situations in which the interaction takes place. Dewey is quite specific when he explains that it is the whole learning environment that the educator must consider.

> It includes what is done by the educator and the way in which it is done, not only words spoken but the tone of voice in which they are spoken. It includes equipment, books, apparatus, toys, games played. It includes the materials with which an individual interacts, and, most important of all, the social set-up of the situations in which a person is engaged. (Dewey, 1938 p.43)

Tailoring the environments or experiences to suit the needs of the present group of individual students is important and the teacher should not assume that materials and methods that have proved effective at other times are still applicable. Failure to tailor the experience to suit the group of individuals may cause a potentially educative experience to become non-educative. This has particular relevance for planning of co-curricular experiences, such as group music performance tours and concerts that in time may become routine or institutionalised and no longer meet or serve the needs and interests of the learners.

Learning through designed learning experience also involves what Dewey described as 'collateral learning' through the formation of enduring attitudes of likes and dislikes that become more important and enduring than the immediate learning content. It is these attitudes formed through learning experiences that provides the interest, curiosity, confidence and desire to go on learning in the future. Dewey emphasised that we should be educating for the present in the present and not preparing for a suppositious future:

> We always live at the time we live and not at some other time, and only by extracting at each present time the full meaning of each present experience are we prepared for doing the same thing in the future. (Dewey, 1938 p.51)

For the educator, this implies that there is a responsibility to create the conditions for positive present learning experiences that will lay the foundation for successful learning in the future:

> When education is based upon experience and educative experience is seen to be a social process, the situation changes radically. The teacher loses the position of external boss or dictator but takes on that of leader of group activities. (Dewey, 1938 p.66)

For Dewey, observation of an experience is not enough and it is only through understanding the significance of what learners see, hear, and touch that they can create a purpose for the activity. He recognised that there should be a balance between busy physical activity and sustained silent concentration, stressing the importance of reflection to organise and make sense of what has been experienced:

> There should be brief intervals of time for quiet reflection... but they are periods of genuine reflection only when they follow after times of more overt action and are used to organize what has been gained in periods of activity in which the hands and other parts of the body beside the brain are used. (Dewey, 1938 p.72)

The essential point for Dewey was that the purpose of the learning experience grows and takes shape through an interactive social process:

> The way is, first, for the teacher to be intelligently aware of the capacities, needs and past experiences of those under instruction, and, secondly, to allow the suggestion made to develop into a plan and project by means of the further suggestions contributed and organized into a whole by the members of the group. (Dewey, 1938 p.85)

Dewey identified the importance of framing learning experiences around authentic, real-life materials and activities that fall within the scope of ordinary life-experience. For the educator, the next step is progressively developing this towards a fuller, richer and more organized form. This equates closely to the ideas of sequencing the learning or identifying the required skills necessary to complete the activity:

> It thus becomes the office of the educator to select those things within the range of existing experience that have the promise and potentiality of presenting new problems which by stimulating new ways of observation and judgment will expand the area of further experience. (Dewey, 1938 p.90)

The educator must be aware of the potentialities that new fields of learning experiences may provide and use this knowledge as the criterion for selecting and arranging the conditions that will influence the students' present experience.

For Dewey, designing the learning experience is about identifying, selecting and organizing the subject-matter so that the learning experience allows the student and teacher freedom for improvisation and exploration. The learning does not emerge or become revealed through the experience, it is an intentional and constructed part of the experience:

> The basic material of study cannot be picked up in a cursory manner. Occasions which are not and cannot be foreseen are bound to arise wherever there is intellectual freedom. They should be utilized. But there is a decided difference between using them in the development of a continuing line of activity and trusting to them to provide the chief material of learning. (Dewey, 1938 p.96)

Dewey was very clear that planning experiences with intention is an important responsibility for an educator. He recognised that a criticism of education based upon experience is that it may appear "chaotic" and less inclined to the organization of facts, rule formation and application of rules:

> The active process of organization facts and ideas is an ever-present educational process. No experience is educative that does not tend both to knowledge of more facts and entertaining of more ideas and to a better, a more orderly, arrangement of them. It is not true that organization is a principle foreign to experience. (Dewey, 1938 p.102)

The notion of problem solving as a learning and teaching strategy was also identified by Dewey:

> It is part of the educator's responsibility to see equally to two things: First, that the problem grows out of the conditions of the experience being had in the present and that it is within the range of the capacity of students; and, secondly that it is such that it arouses in the learner an active quest for information and for production of new ideas. (Dewey, 1938 p.96)

Kolb's Experiential Learning Model

Kolb's Experiential Learning Model (1984) builds upon the belief that knowledge is continuously gained through both personal and environmental experiences. He proposes that in order to gain genuine knowledge from an experience, certain abilities are required by the learner:

- *Concrete Experience* - the learner must be willing to be actively involved in the experience.
- *Reflective Observation* - the learner must be able to critically reflect on the experience.
- *Abstract Conceptualization* - the learner must possess and use analytical skills to conceptualize the experience.
- *Active Experimentation* - the learner must possess decision making and problem solving skills in order to use the new ideas gained from the experience.

Kolb proposes that learners commence with a concrete experience, which leads them to observe and reflect on their experience. Following a period of reflective observation, learners then collect their thoughts and create abstract concepts that explain what occurred, and these concepts guide and inform future actions. With these concept guides in place, learners actively test what they have constructed which lead to new experiences and the renewing of the learning cycle (Baker et al., 2002).

Criticism of this model is offered by Miettinen (2000), who suggests that the concepts are too ill-defined and likely to be interpreted a number of ways. He also notes that Dewey's ideas of non-reflective experience borne out of habit and the need to solve contradictions are not addressed in the Kolb Learning Model. Further extension to Kolb's Experiential Learning Model have been made by Oxendine, Robinson and Wilson (2007). Their model addresses a lack of consideration for the social aspect of learning and how knowledge may be gained by social groups through a common experience.

Reflection

Personal reflection on a learning experience is regarded by many educators as an important step within the learning process (Kolb, 1984; Bandura, 1977). Reflection is explained by Clark (2006) as thinking for an extended period by linking recent experiences to earlier ones, in order to promote a more complex and interrelated mental schema by searching for commonalities, differences, and interrelations beyond their superficial elements.

Many researchers identify Dewey as the originator of the modern day concept of educational reflection (Clark, 2006; Wertenbroch and Nateth, 2000; Kolb, 1984). Dewey (1933) discussed in some detail the relation of reflective thinking to the educative process:

> Reflection involves not simply a sequence of ideas, but a consequence - a consecutive ordering in such a way that each determines the next as its proper outcome, while each in turn leans back on its predecessors. ….. Active, persistent, and careful consideration of any belief or supposed form of knowledge in the light of the grounds that support it, and the further conclusions to which it tends, constitutes reflective thought. (Dewey, 1933 p.X)

For Dewey, reflection is a form of problem solving in which issues can be resolved through chaining several ideas together and then linking each idea with its predecessor.

The published literature on reflection is quite extensive, with many authors defining, explaining, using and advocating a diverse range of constructivist influenced pedagogies that connect theory into practice (Jones, 2004; Moore, 2004; Price, 2004; Fisher, 2003; McCollum, 2002; Rodgers, 2002; Spalding and Wilson, 2002; Donaghy and Morss, 2000; Hankes, 1996). The assumption within this literature is that there are different levels of reflection, as well as different learning and teaching practices that may develop deeper understanding.

Structuring Experiential Learning

Lindsey and Berger (2009) propose the following three universal principles of experiential instruction: *framing the experience; activating the experience;* and *reflecting upon the experience.* They suggest that *framing the experience* is necessary for focussing the learners' attention both during and after the experience:

> How the experience is framed determines the learners' perspectives on the experience and how they engage in it – what they tend to observe or think, what they tend to say or do… this in turn determines to a great degree how valuable the experience is as a basis for subsequent reflection and learning. (Lindsey and Berger, 2009 p.125)

Activating the experience involves the use of knowledge gained from prior experience as well as the creation of new experience. They believe that a learning experience should situate the learning experience within an authentic context and involve the learner in making decisions that have authentic outcomes. It should be problem orientated to some degree and be difficult enough to challenge the learner, but not so difficult that there is not a reasonable expectation of success.

According to Lindsey and Berger *reflecting on experience* requires the teacher to act as a facilitator to prompt reflection through a discussion process that challenges assumptions regarding the learning experience. The reflection process should encourage the learners to consider what happened, why it happened, what they have learned, and how they should apply this knowledge to future experiences (Lindsey and Berger, 2009 p.128).

Lindsey and Berger highlight the importance of experience based learning being situated within and supported by a community of learners and identify a connection to social constructivist approaches to learning. They suggest that "while individuals can and do learn from experience, it is through the shared interpretation of and reflection on experience that learning most effectively occurs in experiential instruction" (Lindsey and Berger, 2009 p.139).

1.3.3 Learning Models and Frameworks

The creation and development of learning design models and learning frameworks are acknowledged as an effective process for methodical curriculum, teaching and learning design (Smith and Ragan, 2005). The learning and teaching literature frequently uses the terms 'framework' and 'model' to describe and represent structures and processes that "serve as guides for developing specific educational activities and environments" (Maker and Schiever, 2005 p.2) A definition distinguishing models and frameworks is proposed by Marzarno and Kendall (2007) who suggest that models are systems that allow one to predict phenomena, while frameworks are "loosely organized sets of principles that describe characteristics of a given phenomenon but do not necessarily allow for the prediction of phenomena" (p.16).

Some examples of Influential educational frameworks and models include: Bloom's *Taxonomy of Educational Objectives* (Bloom et al., 1956); Gagne's *Conditions of Learning* (Gagne, 1965); Bruner's *Spiral Curriculum model* (Bruner, 1960); and Felder's *Learning and Teaching Style Model* (Felder and Silverman, 1988). Within music education, the developmental spiral learning model proposed by Swanwick and Tillman (1986) has continued to be widely cited and extensively reviewed (Swanwick, 2011).

Constructivist influenced learning frameworks began to appear during the 1990s and a notable influence has been the *Teaching for Understanding* framework (Wiske, 1998), which emphasises '*performances of understanding'*, in which the flexible performance capability is the demonstration of the understanding. Within this framework, generative topics are chosen by the teacher that are central to one or more disciplines, are interesting, accessible and have connections to students' experiences. *Understanding goals* are chosen by the teacher to clarify what learning is intended. The *performances of understanding* are linked closely to the *understanding goals* and should be evident throughout the course. Ongoing assessment occurs as a cyclical process through criteria, feedback, and opportunities for reflection throughout the sequence of instruction.

This framework draws upon a 'kind of constructivism' that challenges the centrality of a 'representational view of understanding' (Perkins, 1998), such as the use of conceptual mental models and action schemas often developed through a discovery approach to learning. He explains the framework as follows:

> The performance view of understanding yields a brand of constructivism that might be called performance constructivism because of its emphasis on building learners' repertoire of understanding performances more than on cultivating the construction of representations. (Perkins, 1998 p.57)

Poelman (2002), provides a detailed explanation of this framework from a music educators' perspective, encouragingly highlights that demonstrated performance is already a major component of the way people generally create and experience music.

Challenge Based Learning is a similar inquiry project based learning model that has been developed and promoted by Apple Corporation (Johnson et al., 2009). The emphasis is upon an extended challenging investigation that provides student choice and direction, co-operative learning within teams, the leveraging of technology, and the presentation of a solution or action as an outcome. A portfolio assessment model is devised for each inquiry emphasising deep learning, the publishing of student samples, reflection and documentation generally in the form of a movie, web page or Keynote presentation.

Another influential framework is the *Understanding By Design* model developed by Wiggins and McTighe (2006). The model is a comprehensive and detailed approach to curriculum, assessment and instruction that draws upon Instructional Design strategies and includes many instructional approaches associated with moderate constructivist learning philosophies.

They explain the essence of their design framework to be "How do we make it more likely – by our design – that more students really understand what they are asked to learn?" (Wiggins and McTighe, 2006 p.4). Their emphasis is not upon the outcomes of the learning, as many of these expectations are decided by State and Federal Education bodies, but on identifying the learning experiences and instruction that enables students to achieve the desired results.   They call it a 'Backwards Design Model' and they explain it in the following way:

> One starts with the end - the desired results (goals or standards) - and then derives the curriculum from the evidence of learning (performances) called for by the standard and the teaching needed to equip students to perform. (Wiggins and McTighe, 2006 p.8)

They argue that understanding is not a single goal but a family of interrelated abilities which are revealed through different kinds of evidence. They identify six facets to understanding: Explanation, Interpretation, Application, Perspective, Empathy, and Self- Knowledge (Wiggins and McTighe, 2006 p.82). A musically contextualised discussion of these facets is provided by Parai (2002). She considers that for many music teachers, Backwards Design is not a huge paradigm shift as we music teachers "know where we are going but aren't always sure about how to get there" (p.241). Parai believes that the Backwards Design model could be very helpful for music educators because before beginning to plan teaching and learning experiences, "it reminds us to ask what we would accept as evidence that students have attained the desired understanding and proficiencies" (p.240).

1.3.4 A Music Learning Experience

This folio introduction has outlined a range of literature that supports the perspective that music education could be considered as a learning design process in which a music teacher creates learning experiences that encourage the construction of knowledge, meaning and understanding.

For the purpose of this research, a **music learning experience** is defined as being when a person's current musical understanding is affirmed, enhanced or challenged. This process could occur through active music making (such as; singing, playing, composing etc.), listening, observing, discussing, and thoughtful reflection. This definition allows for a range of environments, activities and experiences to be considered as opportunities for musical learning. These could include formal learning situations such as school classrooms and instrumental music lessons, through to informal learning environments such as community-based rock bands (Green, 2008a). The learning could be an individual process, or guided by a significant other (teacher or another advanced player) or a social group based activity (Vygotsky, 1978). It could even extend to incidental musical experiences contained within other events such as movies, computer games, radio, television, muzak, and social gatherings.

Designed music learning experiences are those where the teacher engages in intentional and direct planning to support student construction of knowledge, understanding and meaning. Designing learning is therefore about making the construction of certain understandings and meanings of knowledge more likely (Reigeluth, 1999). These designed learning experiences could include the structuring of formal curriculum, lesson planning, classroom teaching, co-curricular music making within bands and choirs, as well as tours and excursions. The process of designing musical learning experiences should consider, among other things, framing, activating, and reflecting upon the experience (Lindsey and Berger, 2009).

Although many musical experiences have the potential to become musical learning experiences, not all do so. The reason for this lies in the potential of an experience to provide opportunities for further growth and development of musical understanding. This requires thinking time for the learners to consider and reflect upon what they have experienced. An experience that occurs once and is given no further consideration is unlikely to lead to growth (Dewey, 1938). For the teacher, this means identifying what musical learning outcomes they are seeking, and then designing experience based activities that include guided thinking and reflection time, in order to make these outcomes more likely. Selecting and designing activities that generate engagement and motivation from the learners is an important planning step; one that should be based upon an understanding and consideration of the range of abilities, interests and prior musical knowledge of the learners.

For musical learning to occur during and after the experience, the learners must become attentive, active organisers of their musical thoughts and musical actions, for without this, how would they know if their current musical understanding was being affirmed, enhanced or challenged (Kolb, 1984). It is therefore the teacher’s role, as the learning designer, to check what understandings the student is forming and clarify any points of confusion or misunderstanding (Hattie, 2009). This checking may occur through discussion, written reflections or performance based demonstrations of musical understanding (Perkins, 1998).

Postmodern learning perspectives suggest that each learner possess a complex combination of prior knowledge, values and beliefs, and learning motivations that may result in a positive learning experience for one person, while the same activity could result in a neutral or even a negative experience for another (Kilgore, 2001). Therefore, a negative music learning experience is one that discourages or does not lead to further growth and development of musical understanding. The teacher's learning design should consider ways of minimising such outcomes for learners and actively monitor student understandings and perspectives regarding the learning experience.

How learners construct their knowledge and understanding of a designed musical learning experience is also an important consideration. The Schema Theory (Anderson and Pearson, 1984) and Piaget's model of equilibration (Piaget, 1977) both provide valuable ways of representing how musical learning can occur through a personal process of memory assimilation, accommodation and adaptation. Both theories suggest that a learner's ability to classify and perceive meaning from what they experience is based upon their existing level of understanding, which has been formed from earlier personal and social experiences (Wiggins, 2009). By engaging in periods of personal and guided reflection, the learner can organise their thoughts and consider how the present experience affirms, enhances or challenges their existing musical understanding (Clark, 2006). As each learner personalises the information gained from an experience, the music teacher's role in facilitating the social negotiation of meaning and understanding is important for guiding learners toward a range of socially agreed terminologies, categories, values and beliefs regarding music within their culture (Fiske and Royal, 2002).

1.4 Three Designed Music Learning Experiences

This introduction has framed the research folio from a constructivist epistemological perspective. It has provided common background information linking the three discrete research topics and has also proposed a working definition for this portfolio regarding what a music learning experience is and what a designed musical learning experience can be.

The researcher proposes that the following portfolio topics represent examples of designed music learning experiences that warrant further investigation:

<u>Folio Topic 1:</u> Music ensemble competitions as designed music learning experiences: an examination of the role of ensemble competitions within the secondary school music curriculum and student perspectives on participating in ensemble competitions.

This study explored a teacher designed musical learning experience and focused upon the following question: Does entering school bands and choirs into competitive music ensemble performances help them achieve better musical outcomes than if they only participated in non-competitive performances?

<u>Folio Topic 2:</u> Teacher pedagogy within designed Music ICT learning experiences: examining the pedagogy of secondary classroom music teachers with regard to an extended music remix classroom activity using ICT.

This study examined the pedagogical practice of ten teacher participants and explored the following research questions:

- What are the teachers' pedagogical considerations during this learning experience?
- Can specific examples of pedagogical content knowledge unique to Music ICT be identified?
- To what extent does the pedagogy reflect constructivist influenced teaching strategies?

<u>Folio Topic 3:</u> The creation of a Music ICT instructional resource that demonstrates a constructivist influenced Music ICT learning framework and design model.

This study explores the representation of a designed musical learning experience that integrates constructivist influenced Music ICT pedagogy within a secondary school learning activity. An educational work titled '*Boomacious*' is presented as both a practical instructional resource for secondary school Music ICT, as well as being a demonstration of a researcher developed Music ICT learning framework and instructional design model. A critical explanation details the theoretical underpinnings and developmental considerations that have influenced the work. The significance of the work is then discussed in terms of current practice, with regard to Music ICT instructional resources.

The conclusion reflects upon how the findings of these studies represent designed music learning experiences by considering how they contributed and related to:

- Student learning.
- Promoting musical understanding.
- Pedagogy and classroom practice.
- Secondary school music curriculum.

Research Folio Topic 1

Music ensemble competitions as designed music learning experiences: An examination of the role of ensemble competitions within the music curriculum and student perspectives on participating in ensemble competitions

“Music contests have been a part of secondary education almost from the beginning. They have been controversial for almost as long.” (Miller, 1994 p.30)

2.1 Introduction

Performance ensembles such as bands and choirs, occupy a central position in school music programs. These ensembles fulfil a contextual, social, motivational, and an academic purpose for student learning and development. To fulfil their purpose, performance ensembles need opportunities to perform publicly. These performances may take place within a closed school community or be presented to a larger regional community. Audience members generally regard these performances as a celebration of student achievement, developmental in purpose and often intended to entertain. This non-judgemental perspective on music ensemble performance is juxtaposed with the prevalence of organised music ensemble competitions that focus upon critiquing, evaluating and grading performance groups.

Music Ensemble competitions have been a part of secondary school music education in Australia and the United States for nearly a century (Lees, 2003; Miller, 1994), and could be regarded as simply a competitive extension of the need for music ensembles to perform publicly. However, there is much research literature that suggests the psychological and motivational implications of competing influence student learning and the type of musical understanding they develop.

For the Conductors or Musical Directors of performance ensembles, research suggests that choosing to compete or not to compete in competitions is influenced by their personal values and beliefs and that their modelling of attitudes has a significant influence upon their students' attitude toward participating in competitions (Buyer, 2005; Ponick, 2001; Morgan, 1992). Music educators who choose to enter music ensemble competitions are designing a learning experience from which students learn both musical and social values.

2.1.1 Need for this Research

A broad range of research studies has been published regarding student participation in music ensembles and music ensemble competitions. Most studies are from the United States and many have a marching or concert band focus. Many have been concerned with the effects of competition on music achievement, motivation, attitudes towards competition and judging reliability. Australian studies have explored student motivation and participation in graded instrumental examinations and solo competitions. There are few published studies that have seriously examined student viewpoints on participating in music ensemble competitions and whether they regard the experience as motivational and musically beneficial.

Student centred approaches to learning and teaching emphasise the importance of student choice and voice in influencing the curriculum. Examining student perspectives with regard to participation in music ensemble competitions is an important and necessary process for understanding and establishing the value or otherwise of this learning experience and the role that it plays in developing musical understanding.

2.1.2 Research Question and Research Focus

This research is based upon a single question:

> Will entering school bands and choirs into competitive music ensemble performances help them achieve better musical outcomes than if they only participated in non-competitive performances?

This research defines 'musical outcomes' to mean a music ensemble's ability to demonstrate through the performance of its repertoire, expressive musicianship and technical control. This may be represented by the accurate and appropriate use of: notes, rhythm, dynamics, phrasing, articulation, style, tone, texture, blend, and responsiveness to the conductor's direction. The use of the word 'better' implies that musical outcomes are something that can be measured in an objective manner. For the purposes of this research, the quality of the performances is considered and measured through the subjective opinion of students' perspectives.

This research examines the views and perspectives of high school students engaged in co-curricular music ensembles as they participate in a designed music learning experience that includes participation in an ensemble music competition. The research period was for a calendar year and initially examined the learning design perspective of the ensemble directors and the extent to which competitive and non-competitive performance values were embraced or considered. Student perspectives were then tracked through three questionnaires, one pre-competition, one post-competition and the final questionnaire toward the end of the ensemble year. The researcher sought to gain an insight into the range of influences that an ensemble music competition may have upon students' regard for their personal and group musical development, personal motivation, group motivation and group achievement.

2.1.3 Definitions

Co-curricular refers to a school based educational activity that fulfils a particular social function regarded as complementary to the official core curriculum subjects. Organisationally, music ensembles are often co-curricular and rehearsals are timetabled outside of scheduled lessons.

Music ensembles are defined as three or more people who combine together into an identifiable group for the purposes of collectively making music.

Competitions are regarded as non-compulsory contests designed to compare and rank participants based upon their demonstrated performance against known criteria.

Values and beliefs are recognised as the personally chosen and culturally mediated, ideals regarding what is good, desirable or not desirable. They also include the assumptions and convictions that are held to be true regarding concepts, events, people, and things by an individual or a cultural group.

Student perspective is regarded as a point of view; a way of regarding something; an opinion; or a particular attitude towards something, and is likely to be based upon personal experience, values and beliefs.

Ensemble director is the person responsible for conducting a music ensemble through rehearsal and performances but who may also fulfil other roles associated with an ensemble. These roles may be: selecting repertoire; planning and scheduling events and tours; and recruiting and training musicians. They may or may not be a qualified or registered classroom music teacher; however, for legal reasons (duty of care) they are likely to be assisted by a registered teacher. Within this research, the term, music ensemble teacher may be used interchangeably with ensemble director or ensemble conductor.

2.2 Review of Literature

This literature review explores the issues surrounding school based music performance ensembles as well as the complex nature of competition and how this is represented within a range of institutionalised music ensemble competitions. An examination of the published research literature regarding music ensemble participation within competitions is undertaken, as well as a summary of motivational theories as they may apply to music ensemble participants.

2.2.1 Secondary School Music Performance Ensembles

Instrumental and vocal music ensembles play a significant role in supporting student learning through all levels of Australian schooling. Within the secondary school context, music ensembles may occur as both a classroom curriculum based activity or as co-curricular activities that occur outside of regular lesson times where student participation is voluntary. The purpose and repertoire of these ensembles is contextually and culturally defined (Pascoe et al., 2005 p.19).

The complex nature of school communities encourages the formation of diverse musical ensembles to accommodate cultural traditions as well as student, teacher and community interests, abilities and aspirations (Walker, 2006). Schools founded upon religious ideals may require certain types of functional musical performance groups for worship that may have a contemporary or traditional musical focus while other public and independent schools may focus upon ensembles that require significant prior instrumental skills (Dillon, 2007). These ensembles may be exclusive, elite and selective performance groups or they may be inclusive, large and small group music making activities aimed towards recreational music making.

A typical range of co-curricular performance ensembles may include: Choir, Vocal Ensemble, Concert Band, Stage Band, Jazz Band, Rock Band, Guitar Band, Orchestra, String Ensemble, Percussion Ensemble, Drum Corps/Line, Pipe Band (Bagpipes and drums), Electronic Music Ensemble to name but a few.

Ensemble Instruction

Although many music ensembles are regarded as co-curricular and voluntary for students, the planning for musical learning is a major focus for music ensemble directors. Designing a music learning experience for a music ensemble requires a range of instructional strategies that draws upon the musical skill, teaching experience as well as the philosophy and beliefs of the instructor. The cliché “we teach how we were taught” (Bennett, 1991) is but one of many possibilities. Direct instruction emanating from the conductor is perhaps the accepted and most ‘efficacious’ means of conveying information to ensembles pursuing group performance goals (Colwell, 2011 p.99). Other student centred approaches have been proposed by Shively (1995) and Green (2008a).

Constructivist Influenced Music Ensemble Research

Shively (1995) applied constructivist thinking to a beginning band program and developed a framework for what a constructivist approach might be. He drew upon the work of Jerome Bruner, Elliot Eisner and Nelson Goodman. Although Shively recognised that all knowledge is constructed by the learner, he questioned the extent to which all musical decisions can be made by the learner if effective instruction is to occur. Shively paid particular attention to the social context and reflexive nature of music knowledge and the interplay between learner and teacher. These pedagogical considerations emphasised: teacher modelling in problem solving; consideration of learners' previous music knowledge; collaborative learning; situated cognition; authentic learning; cognitive apprenticeship; scaffolding; and multiple perspectives.

Broomhead (2005) highlighted the importance of teaching for musical independence through recounting his response to a self-directed student choral performance that did not reflect the attention to musical expression he thought he had taught the students for several years. His strategies for addressing this lack of expression highlighted the importance of regular and ongoing problem-solving opportunities, giving students greater responsibility and encouraging independence through small group work, formal phrase-shaping practice and informal phrase-shaping practice.

Another qualitative study focussed upon the sociocultural and musical influences on children's construction of musical knowledge and how music learning was mediated by tools and people within contextual constraints (Lim, 2005). The study included three elementary music teachers involved in teaching six classes and a professional community orchestra program. Data included observation notes, student journals, classroom videos and student and teacher interviews and the analysis involved coding and recording emergent themes. The findings indicated that tools (the educational resources and devices used by teachers and students) and people did mediate musical knowledge construction to a great degree. Lim recommended that teachers select a smaller repertoire of music to study in depth and to teach music elements from within this whole.

Whatever instructional approach is employed, co-curricular music ensembles are praised or criticised based upon the quality of their public musical performances. Motivating students to invest time towards achieving musical quality while still nurturing the joy and fun of music making is but one of many important priorities ensemble directors must balance.

2.2.2 Competition and Cooperation

It is common for publications dealing with competition to explore the positive and negative aspects of competition while also exploring the virtues of cooperation with and without competition; cooperation is often presented as a model of alternative behaviour (Shields and Bredemeier, 2009; Kohn, 1992). I will therefore present my review of this literature by linking the topics of competition and cooperation.

Competition is defined by the Oxford Dictionary (2010) as 'the activity or condition of striving to gain or win something by defeating or establishing superiority over another', while cooperation is defined as 'the action or process of working together to the same end.' The social implications of competition and cooperation have been studied in the fields of psychology, sociology and anthropology and have extended into all forms of human interaction such as Business, Law, Politics, Sports and Education (Magretta, 2012; Roemer, 2006; Birkhead, 2000; Olzak, 1992; Walker, 1986).

Music ensemble competitions require participating groups to engage in behaviours that demonstrate intragroup cooperation in order to learn and collectively perform music with technical and expressive accuracy while at the same time they engage in intergroup competition by participating in contests where one group's musical performance is compared to those of other groups.

Competition and cooperation have been identified to exist in human behaviour since recorded time (Deutsch, 2000). The assumption that humans are 'pre-wired' to compete because of pre-historic inbuilt survival instincts is challenged by authors such as Deutsch (2000), Kohn (1992) and Mead (1937) who suggest that both cooperation and competition are learnt behaviours.

Earlier research by anthropologist Mead (1937) suggests that competitiveness is a culturally created aspect of human behavior, and that its prevalence in a particular society is relative to how that society values it. Mead studied dozens of 'primitive' cultures that did not prize competition, and, in fact, seemed at times to place a negative value on it. In her study of the Zuni Indians of Arizona, Mead found that they valued cooperation far more than competition. Mead gave the example of a Zuni held ritual footrace that anyone could participate in and where the winner was never publicly acknowledged and if a person made a habit of winning the race, they were prevented from participating in future races.

Following the Second World War, Deutsch (1973) began studying how competition and cooperation affected individual and group dynamics in a broad range of settings. Deutsch and Krauss (1965) developed a social interdependence theory that suggests people's behaviour is mostly goal driven and that although people can pursue many goals independently they are often connected or interdependent. This means that one person's success or failure has a positive or negative impact on another's goal pursuit. Positive interdependence occurs when one person's success makes it more likely that others will also be successful and this is evident in cooperative situations such as music ensembles. Negative interdependence occurs when the success of one makes it less likely that others can be successful and Deutsch identifies this as the essence of competition. This occurs in music ensemble competitions where for every winner or first place there is at least one group that is judged to be something less.

Kohn's (1992) significant literature research into the nature of competition support the view that competition is socially constructed and wrongly justified by assumptions concerning human nature. Kohn defines competition as any situation where one person's success is dependent upon another's failure. This includes two or more parties pursuing a goal that cannot be attained by all participants. He refers to this as 'mutually exclusive goal attainment' (MEGA). He identifies two types of competition,' structural competition' such as a tennis match or in our instance 'a music ensemble competition' where the rules of participation, scoring and rewards for success are clearly understood by all participants. The second type is 'intentional competition' and is reflected in an individual's competitiveness for besting others regardless of formal scores or declaration of winners or losers.

A famous social experiment referred to as Robbers Cave was reported by Sherif et al. (1961), which explored competition between groups and conflict resolution. In their study, 22 boys experienced a summer camp environment that created intragroup harmony while concurrently creating intergroup competition between another camp group. Their study not only identified the negative impacts of competition but also explored solutions through shared problem solving and cooperation.

A meta-analysis of similar studies (Johnson and Johnson, 1991) concluded that "cooperation without intergroup competition [may promote] higher achievement and productivity than cooperation with intergroup competition," If these findings are transferable to a musical environment this would suggest that group musical achievement may be higher without ensembles participating in ensemble competitions. Kohn states that "The simplest way to understand why competition generally does not promote excellence is to realize that trying to do well and trying to beat others are two different things" (Kohn, 1992 p.55).

Deutsch (2000) suggests that people in competitive settings are likely to display the following behaviours:

- Viewing the other party in a negative way.
- Regarding opponents in prejudicial and stereotypical ways.
- Exhibiting behaviour towards opponents that is hostile, demeaning and aggressive.

As a result,

- Interpersonal tension and anxiety are increased.
- Effective communication between parties is reduced.
- Resources are used poorly and sharing becomes minimal.
- People become less productive.

The negative outcomes of competition, viz., distrust, coercion, hostility, deception, intimidation, aggression and lower productivity, are not based on personal characteristics but seem to flow from the structure of competition. Deutsch acknowledges that not every competition results in dramatic negative consequences but that over time, consistent participation in competition leads almost invariably to manifestations of these behaviours.

Other writers such as Shields and Bredemeier (2009) argue that competition is not the villain it is socially portrayed to be by Kohn and Deutsch. They argue that the 'prosecution' of competition is possible because of the assumption that to compete and to contest are regarded as the same thing. They suggest that they are two very different processes or activities with quite different characteristics.

According to Shields and Bredemeier, the origins or etymology of the word competition comes from the Latin '-petere' that means 'to strive' or 'to seek' which is combined with the prefix 'com-' meaning 'with'.   The root meaning is therefore 'to strive with' not 'to strive against'.

They suggest that when the fragile balance of seriousness with play, intrinsic and extrinsic motivations and outcome and process orientation becomes upset, competition degenerates into 'striving against' rather than 'striving with'. They create the word 'decompetition' to identify and label the 'bad' twin from the 'good' twin, 'true competition'. This re-labelling of terminology supports Shields and Bredemeier view that certain types of competition are acceptable while cautioning against the harmful vices of 'decompetition'.

Csiksentmihalyi (1990) concurs with Shields and Bredemeier that competition is not all bad, implying that it is our perspective and attitude to competition that determines if it is an incentive or a distraction.

> What each person seeks is to actualize her potential, and this task is made easier when others force us to do our best. Of course, competition improves experience only as long as attention is focused primarily on the activity itself. If extrinsic goals—such as beating the opponent, wanting to impress an audience, or obtaining a big professional contract—are what one is concerned about, then competition is likely to become a distraction, rather than an incentive to focus on what is happening. (Csikszentmihalyi, 1990 p.73)

Competition and cooperation were explored within a school setting by Takata (1997) through the use of a modified game of musical chairs. As chairs are removed all players remain in the game and must cooperate to find a lap to sit on. The ensuing discussion established why cooperation, leadership and patience are important if we are all to remain involved and contribute; personal qualities that may be of benefit to students involved in ensemble music making.

Before examining the literature regarding competition and music ensemble competitions, it is important to acknowledge that a growing body of music literature identifies cooperation as an important component of student centred music pedagogies.

Cooperative and Collaborative Learning within Music Education

Cooperative learning is described as an instructional approach that designs group interaction as an integral part of the learning process (Kaplan and Stauffer, 1994 p.V). Each member is regarded as integrally involved in the collective task and without their contribution, the activity would disintegrate (Green, 2008b p.181). Strategies and learning models for establishing cooperative learning within music activities have been documented by a range of educators (Katz and Brown, 2011; James, 2008; Froehlich, 2004; Kassner, 2002; Kaplan and Stauffer, 1994), while cooperation as a specific research topic has been explored within cooperative listening studies (Smialek and Boburka, 2006).

Within music education research, cooperation is generally regarded as a process situated within collaborative activities (Rees, 2002). Collaboration is identified within a growing number of research studies as an important component within a social and contextual student centred learning and teaching process (Burnard, 2012; Dillon and Brown, 2007).

Green (2002) researched the informal learning habits of a range of adult musicians and noted that cooperative group collaboration, self-direction and peer teaching were important factors in their initial learning and continued musical involvement. From this research, Green designed an informal learning model (2008b) intended for secondary school music curriculums which emphasises self-directed, cooperative and collaborative student learning strategies supported by a facilitative teacher pedagogy.

We will now explore how these considerations towards competition and cooperation are evident in music ensemble competitions.

2.2.3 Organised Music Competitions

The origins of organised social competitions pre-date history with evidence of organised competitive games and competitions firmly established in the literature of ancient Greece and China (Crowther 2007; Spivey, 2004). Organised music competitions are said to have existed from as early as the 6th Century BC in the Pythian Games held in Delphi in Ancient Greece (Stanford, 2003). The Centre for Greek Musical Tradition, LyrAvlos goes on to state that,

> From the archaic period music gradually assumed a more complicated form and role, the result of this development was that special music competitions were organized in many parts of Ancient Greece. Some of the oldest music competitions ever registered are the “Karnea” in ancient Sparta which was a place where music was highly respected and connected with the training and education of the youth. (LyrAvlos, 2012)

The Oxford companion to Music (Latham and Spencer, 2012) claims that meetings of Welsh Bards know as Eisteddfodau are reported from the 7th century AD and the French Medieval Puys which followed from the troubadour tradition of song and poetry competitions flourished during the 17th century. By the end of the 18th century rural Britain was seeing publicans organise singing contests as attractions and by the late 1840s the Brass Band competition movement of Northern England had become so widespread that in 1853 the first British Open Brass Band Championships were held in Manchester. Renowned music educator John Curwen organised Choral Competitions in London during the 1860s that were extended by his son Spencer at the 1882 Stratford Festival into what was to become the modern Eisteddfod model; including categories for solo instrumental, ensemble, solo vocal and choral performance. By the turn of the 20th century music competitions for soloists, choirs, bands and composers were well established across Europe, the United States and British Colonial and Commonwealth countries. (Latham and Spencer, 2012)

By the end of the 20th Century and the start of the 21st Century international music competitions such as ‘Eurovision’ and commercially owned national ‘Pop-Idol’ and ‘X-factor’ style contests continue to reinforce a view that music can be ‘enjoyed’ and ‘performed’ for competition. Labels such as ‘Piano Contest’ and ‘Choir Competition’ identify an event as requiring participants to approach the activity with an understanding that they are in a competitive environment and the psychological implications of this are significant. Crutchfield writing on piano competitions suggests “The emotional stamina to tough it out through round after round as the competition winds on and the stakes rise, does not necessarily go along with the emotional sensitivity to make five minutes worth of truly remarkable Chopin” (Kohn, 1992 p.54). Kohn goes on to state that “artistic excellence is not promoted by making performing artists compete” (p.56).

Overview of Australian School Music Ensemble Competitions

Australian school based music ensembles have been participating in competitions and festivals since the early 1900s (Lees, 2003; Sutherland and Lane, 1929). The community Eisteddfods of the late 1800s played an important role in providing community based music competitions within Australia (Filmer-Davies, 2001). The Welsh Eisteddfod traditionally had an emphasis upon poetry and song but in Australia this was expanded throughout the early 1900s to include Brass Bands, instrumental music, dance, calisthenics as well as such diverse categories as cooking, gum leaf playing and school aerobics. School based choirs and brass bands began to participate in Eisteddfod categories during the late 1920s (Royal South Street Society, 2011).

One of the earliest records of Australian schools participating in competitions is an article in the Adelaide Register (1893) announcing a public schools’ singing competition. In 1929, George Sutherland from the Melbourne music retailer Allan and Co. Ltd., reported that the Education Department of Victoria was supporting a competition for 10 school bands and that this would be included in the annual celebrations of the whole of the State Schools of Victoria Music (Sutherland and Lane, 1929). Lees (2003) identified that in the first year of the Sydney Eisteddfod, 1933, Fort Street Girls’ High School scored a well-deserved win in the State School Choirs section, while students from The Priory at St Mary’s Moss Vale, won the Juvenile Choral Championship.

Throughout the 20th Century, music competitions and festivals for Australian schools have flourished. The initial Eisteddfod style of competition was joined by the increasing influence of American musical education culture and its emphasis upon regional festivals and competitions. By the start of the 21st Century there has never been greater choice or opportunity for schools to participate in music ensemble competitions. Some of the significant festivals and competitions include: the Sydney Eisteddfod; the Melbourne School Band and Strings Festival; the National Choral Eisteddfod (Canberra); Generations in Jazz National Stage Band Awards (Mount Gambier); Brisbane Schools Band Festival; the Adelaide Choral Eisteddfods and the South Australian School Band and Orchestra Festival as well as the West Australian Schools' Concert Band Festival, to name but a few. The Australian National Eisteddfod Society also lists over 100 active Eisteddfod Societies across Australia offering competition sections suitable for school music ensembles (Australian National Eisteddfod, 2012).

Australian Music Ensemble Competition Formats

Competition and festival formats have changed emphasis during the past century as community expectations and values shift. A review of the published internet details for several significant Australian music ensemble competitions and festivals identifies the following common elements:

Common Elements:

- Performance categories with self-selected divisions.
- A public performance with the opportunity of hearing other performance groups.
- A repertoire list with some stylistic freedom of choice with time limit constraints.
- Adjudication or evaluation that involves performance feedback with some form of ranking. (This ranking could be an achievement level such as; Gold-Silver-Bronze or Outstanding-Excellent-Merit or a placing number 1st-2nd-3rdetc..).
- Recognition of achievement through prizes, trophies or certificates.

Added Elements in Some:

- Performance recordings are provided.
- Tutorial style coaching from a guest conductor/adjudicator.
- A guided analysis of a video recording of the ensembles performance.
- Initial playoff-style sectional performances which then lead to a culminating adjudicated showcase performance.

Scheduling:

- Most competitions are scheduled between May and August during the second and third school terms.

(Generations in Jazz, 2011; Melbourne School Band and Strings Festival, 2011; Sydney Eisteddfod Choral Syllabus, 2011; Western Australia Schools' Band Festival, 2011)

Origins of School Music Competitions in the United States

As much of the research literature on Music Ensemble competitions comes from the United States it is appropriate to understand its origin. In the United States, the development of competitive school based music events has proliferated since the 1920s (Hurst and Ramsey, 1991; Burdett, 1985). Most researchers refer to the National School Band Contest of 1923 as the beginning of the competition movement (Burdett, 1985; Moore, 1972; Holz, 1960). There is disagreement as to the original motivation for why competition commenced, with (Klausman, 1966) citing the influences of increased immigration and the Welsh Eisteddfod Festival while others suggest it was the financial motivation of the music industry to increase instrument sales (Oakley, 1987; Burdett, 1985; Whitehill, 1969). The first 1923 contest proved to be such a success that it encouraged music educators to pursue and develop this format. By 1926 it became a national contest and by 1929 included orchestra, solo and ensemble contests. Despite complaints from many music educators, contests thrived throughout the 1930s replacing adjudication ranking with ratings (ranking being the sequential ordering of ensemble placing's e.g. 1st, 2nd .. 12th; while ratings are a criteria based standard of achievement allowing several ensembles to be awarded a 'Gold' or '1' rating). Following World War Two, the competitions became more state and regionally based. Burdett concluded that because music educators never formulated a specific philosophy, goals or objectives for the contests, the competition events continually changed and evolved to suit the 'needs of the times' and school community aspirations (i.e. an educational purpose). Hebert (2011) states that:

> In recent decades, most American school band contests have transformed into 'festivals' in which less emphasis is placed on obtaining awards. Festivals may include a clinic or workshop component, in which an accomplished director conducts the group through some of their pieces and attempts to give helpful tips to the director and students. (p.150)

Research Exploring Student Participation in Music Ensembles

The reasons students participate in music ensembles have been examined by a number of researchers. Aspin (2000) suggests that people are drawn to arts participation for both the social benefits and the enjoyment that comes from being involved in a creative activity. Mills (1988) found the most meaningful aspects of participation in bands to be personal development, social enrichment, musical growth, development of group identity and re-creative activity. A study by Young (2001) found that non music majors persisted in college band ensembles because it was their primary source of social activity and because it was regarded as enjoyable and exciting. An

Australian study by Rosevear (2003) identified that the social aspect in class-based ensembles seems to be a strong feature of what students like about music as a school subject. The institutional structure of the school music curriculum is built around the context of music making as a group; the aim of which is performance and the meaning of which is socially expressive and shared by the school community (Dillon, 2007).

Research Exploring Why Music Ensembles Compete

A range of studies from the United States has explored why ensembles choose to participate in music ensemble competitions. Buyer (2005) discussed the ‘pros’ and ‘cons’ of music competitions from a director’s perspective and concluded that competition has the potential to help students become better musicians and through participation in competitions they will be more successful in developing self-discipline, good practice habits, high expectations, and pride as compared to those who do not compete.

Hurst (1994) investigated 293 United States high school band directors’ reasons for participation in music competitions and found that directors believed that they provided a sense of accomplishment for students, helped maintain quality student performance and high standards for music education, provided a means of evaluation, as well as a clear goal for instruction. Hurst found that frequency of participation was not an important variable for differentiating the reasons for band directors participating in competitions and suggested that regional cultures of competitiveness play a role in band directors choosing certain types of competition.

An earlier study by Rogers (1985) surveyed principals and marching band directors from 421 schools across the United States. It concluded that principals ranked highest the value of contests in improving public relations for the school while ensemble directors rated the value of contests to the benefit of each student’s discipline, responsibility, self-esteem and other personal benefits as the highest.

During 1983, the Music Educators Journal (Volume 69 and 70) featured a special focus upon music competitions in which letters from music educators revealed a wide range of opinions concerning the value of contests. It was accepted that competitions can aid group interaction, build morale, and serve as incentive for student development, but urged that students should be judged on musical abilities, not showmanship. It was stated that an emphasis should be placed on learning music rather than on winning (Schouten et al., 1983).

A comprehensive list suggesting why music ensembles participate in competitions was developed by Ponick (2001). Key points from this list include: students may be motivated by competition;

competitors are exposed to other performing groups; teachers may have an in-service development opportunity; students learn to perform under pressure; some students work harder for tangible prizes; provides a focus for school community support; judges provide feedback; students meet peers with similar musical interests; students' achievements are assessed and measured; advancement over time is a positive reinforcement. Ponick goes on to suggest that the negative side of competitions include: students see peers as adversaries; judges' feedback may be idiosyncratic or incomplete; some students are unable to perform under pressure; the educational emphasis of teachers may be distracted by the pressures of competition; students should understand that success doesn't always mean winning; community support may diminish if group 'loses'; only one event is judged, not a group's improvement over time.

LaRue (1986) determined that the extent and degree of contest emphasis in a band program did not alter the consensus from the band directors, band members and parent groups that competition was valued as a source of pride for both group and individual competition. According to Humphreys, May and Nelson (1992) there is consistent evidence that the more a band competes, the more favourably the competitive activities are viewed by members of the organization. Most of the benefits of competition as perceived by students, directors, parents and administrators are mostly extra musical.

A different study by Chou (2001) found that student participation in the Taiwan National Music Competition for school bands became more positive during the pre-competition and final preparation periods and was maintained following the competition period. He also found that participation in the band contest deeply influenced students' interest in playing their instruments and their satisfaction with the band program.

Gwenichi Kawakami, the founder of the Yamaha Music School system, cautions that despite the acknowledged musical excellence of Japanese Band and Choral high school music competition programs and their popularity within the schooling system "competition is a necessary evil, because it provides learners with the opportunity to be recognized by the world. However, it leads to a decadence in music, if we think the aim of music is just to compete" (Kawakami, 1987 p.234).

Research into International Music Competitions

McCormick (2008) examined the role of international music competitions as a cultural sociology tool and concluded that any discussion of the relative worth and value of competitions is philosophically subjective. In her view, their significance is that they provide a public forum where competing meanings, ideals and cultural commitments can be negotiated.

Jonusas (2010) identifies that European countries such as Lithuania have developed national singing and choral competitions as a natural part of their national musical fibre and that Lithuanian choirs consistently compete in international competitions.

The World Federation of International Music Competitions of Switzerland has published recommendations for Western classical music competitions and this document offers guidance in formulating fair and equitable competitions (WFIMC, 2012).

Research into Competition Grading

O'Neill & McPherson (2002) identify that in countries where music competitions and graded performance examinations flourish (Australia, British Commonwealth, North America), music educators disagree about the real worth of evaluations that are based on some sort of ranking or assessment.

There have been a number of studies examining the participation in and judging variables of marching band festivals and most conclude that adjudication reliability is generally of a high standard. The significant factors contributing towards success are the school size, allocated budget, levels of staffing, number of festivals attended and concurrence of concert and wind band programs (Rickels, 2008; Brakel, 2006; Sullivan, 2003; Davis, 2000).

Austin (1988) examined the effect of two music contest formats on the music achievement, self-concept, achievement motivation, performance achievement, and attitude of elementary band students. He found that most students prefer to participate in a rated contest format instead of only receiving comments on their performance (as in a festival).

Other educators such as Miller (1994) suggest that ratings and criteria charts should be comment only as it is too difficult for people to move beyond an overall ranking score despite positive feedback comments.

> All contests, be they competitive or not, should be done without rating systems at all. Very few directors, let alone students, are able to get past the number they receive and objectively analyse the comments of the adjudicators. The reaction a director has to a critical comment about phrasing is different when accompanied by a 1 rather than a 3. (Miller, 1994 p.31)

Research into Musical Achievement and Competitions

Studies in the United States have investigated the relationship between Musical Achievement Test (MAT) scores (Colwell, 1969) and competition success. West (1985) found that there were significant differences between students' MAT scores and the success or otherwise that the individual or ensemble group might have achieved in a competition. Temple (1973) explored the effectiveness of competition festivals in the music education process and found no comparable performance achievement level differences between competitive and non-competitive. However, music achievement scores were significantly higher among non-competitive band members compared to those who were competitors. This suggests that to some degree, competition may inhibit levels of musical achievement, a view supported by the studies of Wood (1973) and West (1985).

Payne (1997) reviewed research on American secondary school band competitions and suggested that competition strengthens musical achievement. Head (1983) compared varying band teaching emphases and found that there were no significant differences in student attitudes toward music learning among high school students whose directors emphasized contests or competitions and non-competitive performances.

Other studies challenge the view that competition improves musicianship. Hayslett (1992) explored the effect of band contest participation upon band members' perceptions of contest rating importance, musical achievement and self-worth once they had participated in ensemble and solo instrumental contests. This study found that students in the ensemble choosing comments-only demonstrated a significant attitudinal decline in 'Rating Importance' whereas students in the Ratings group continued to value highly this format. These findings support the view that the more one competes, the more one values competing. Students in the ratings group tended to draw more parallels between high ratings and musical success while also expressing concerns that they may have achieved less musical learning and skill development due to their competition focus.

A study by Hebert (2011) into the Wind band programs of Japanese Schools found that the cultural pressure for measurable success provided by 'Gold' standard awards in valued competitions led to many high school bands practising over 20 hours per week in the lead up to competitions with band members viewing preparation positively but indicating that it was difficult to balance the responsibilities of academic work with long hours of band rehearsal. The excellent performance standards that were achieved through this intense rehearsal focus were not always rewarded with the highest standard causing one band director to concede that the competition was of only limited usefulness to students in terms of educational objectives but that as a motivational tool it raised the standard to a high level that could then be sustained throughout the year.

Research into Music Curriculum and Ensembles

Jones (2008) highlighted the dilemma that school based music educators confront when perpetuating a traditional curriculum that includes large ensemble groups such as Concert Bands, Choirs and Stage Bands with what he described as ‘the 21st Century educational model’. The impact of high stakes testing, constricting of curriculum time due to new subject choices, narrowing of elective subject options, technology driven change in the way we experience music, as well as changing social structures and individual expectations, result in curriculum music competing for students’ attention and social relevance. He warns that these issues make a significant impact upon student participation in voluntary co-curricular ensemble music activities.

Research by Meyers (2011) suggests that in the United States, competitions and festivals are regarded as an assumed part of the High School music ensemble experience. Meyers explored the attitude of 557 high school band directors in the United States towards solo and ensemble activities and their participation in solo and small ensemble festivals and contests. The study found that directors understand and believed strongly in the benefits of solo and small ensembles within a school curriculum but that their inclusion after the core large group ‘marching band’ focus was hindered by other factors such as individual job demands, band program expectations, approaches to festival and contest adjudication, format and scheduling of festival and contest events.

Research Examining Motivation in Performance Examinations

Although music ensemble competitions, solo instrumental competitions and graded instrumental examinations are mutually exclusive activities, research in each of these fields offers further insights into a range of student motivation factors influencing the way they regard their music performing experience.

A study by Schmidt (2005) statistically examined the relationships between motivation, performance achievement and the musical experience of secondary school instrumentalists participating in a solo instrumental festival competition. He found that students reported their own success as best defined by mastery and cooperative orientations, as compared to competitive and ego orientations. Similarly, students believed they learned the most or did their best when working with other students, suggesting that intrinsic or cooperative aspects of instrumental music rather than extrinsic or competitive aspects of music are significant to student motivation.

McPherson and McCormick (2000) examined instrumentalists' motivational factors with regard to individual externally assessed music performance examinations. Results showed that an ability to perform proficiently relied not only on technical and expressive skill, but also on the employment of a range of student motivational resources. They suggest that how students think about themselves, the task and their performance is just as important as the time they devote to practising their instrument.

In another article, O'Neill & McPherson (2002) suggest that:

> Since formal evaluation of solo and group music performance is so common in schools and community music programs, there can be no simple answer to the question of whether it hinders or curtails motivation….., success in any form of music evaluation is likely to depend not only on the amount of time students devote to practicing but also on the way they feel about the examination and the degree to which they believe in themselves and feel confident enough in their own ability to give the performance evaluation their best efforts. (p.42)

These three research findings indicate that the motivational significance of an event such as competitive and non-competitive music performances are only one aspect of the motivational resources that students and teachers may draw upon to encourage continued musical involvement and development.

Research Exploring Student Attitudes Towards Music Competitions

Koutz (1987) examined the attitudinal differences towards music performance by secondary school participants and non-participants and found that music students participated due to an interest in music, group pride, and an enjoyment of performing. Nurturing and developing this enjoyment of performance has been identified as one of the goals of participating in ensemble competitions.   In high school band programs containing varying degrees of competitive performance emphasis, Head (1983) found that students displayed no differences in attitudes towards their music activities regardless as to whether they participated in competitions or not.

Conflicting research evidence, suggesting that students do perceive competitive and non-competitive performance differently, is provided by Sheldon (1994). In the study, 226 high school band students from three high schools were divided into Contest Rehearsal and Concert Rehearsal Groups and each listened to and rated two band music excerpts using a Likert-type 10 point scale focussing upon: correct notes, rhythm accuracy, tone quality, intonation, expressiveness and overall rating. The Contest Group were told the band excerpts were from a band preparing for a contest and the Rehearsal Group were told the band was preparing for a concert. She found that the Contest Rehearsal Group rated performances significantly higher in every rating as compared to the Concert Rehearsal Group. Sheldon speculates that students in the Contest Group may have considered the presumed effort of students participating in contests as more worthy of higher recognition and that there may be an assumed higher degree of importance attached to the different goals of contest and concert. Sheldon states:

> Results could possibly indicate a level of motivation students bring to performance situations that may impact upon their levels of effort given in the performance event. … further implications could be drawn for the director of performing ensembles in terms of how they might influence students' perception and subsequent preparation. (1994 p.38)

This research encourages the further exploration of the student perspective of being an active participant in competitive ensemble performances. It suggests that students may exhibit greater degrees of motivation and effort depending upon the emphasis a director has placed upon a performance event. It would seem sensible therefore to ask students how they view their motivation and preparation towards competitive and non-competitive performances.

Research into Non-Competitive Ensemble Experiences

Clouding the potential social and motivational benefits that competitive music events may provide is the possible overemphasis upon winning and the philosophical belief that the same levels of motivation could be achieved in non-competitive settings (Austin, 1990; Burnsed and Sochinski, 1983). Links between self-esteem and gains in music skill and achievement have been demonstrated to have been achieved through non-failure situations (Michel, 1971; Greenberg, 1970) concurring with non-music classroom research focussing upon cooperation rather than competition (Johnson and Johnson, 1991; 1985).

Austin (1988) explored a range of competitive and non-competitive constructs within individual instrumental or band performances during the late 1980s. Austin found an overwhelming support by students for a competitive format. In this study he assigned elementary band students to either a contest ratings with written comments (competitive) or a comments-only group (non-competitive). After a month of individual work on their solo pieces, students were tested for music achievement, self-concept, achievement motivation and attitude towards the different performance formats. He found that students in both groups showed significant gains on the self-concept measure but only those students participating in the ratings showed gains in aural perceptual achievement. Austin speculated that this could be linked to greater student motivation to practice and other data such as 66% of students indicating that they worked harder when working towards a rating compared to only working for comments. This research finding suggests that students do prepare and approach competitive and non-competitive performances differently.

In another published study by Austin (1991), he found that students with lower music self-esteem seemed to favour non-competitive settings. In a further study by Austin and Vispoel (1992) goal structure effects were examined and their findings cautioned that "competitive classroom arrangements may work to boost music interest in the short term, but actually undermine the teachers' long-term efforts to produce a population of literate and appreciative consumers of music." (p.18)

Research into the Long Term Effects of Music Ensemble Competition

Zdzinski (2004) examined the views of drum corps alumni and their reasons for continued participation following high school and college. He concluded that the love of performing, social network, personal development and musical development were significant factors in continued involvement. Participation in competitions was also regarded as an enjoyable and motivating aspect of continued involvement in the drum corps.

Arnwine (1996) explored the relationship of high school music instruction in band classes with continuing interest in music and found that the amount of competitive activity in band made no significant differences in the amount of continuing musical activity after high school.

Research into Designed Competitive Ensemble Experiences

Further research studies have examined music learning experiences that have competition as an integrated part of their learning design.

Morgan (1992) examined the directors' behaviours and students' perception of a high school choral ensemble which participated in and achieved 'superior' ratings in state choral competitions in the United States. He used ethnographic research techniques that involved the observation of 50 rehearsals with field notes, audio tapes and formal and informal interviews with the teacher and 50 of the 72 members.

In this study, Morgan found that the choral director created an influential culture that became mirrored through student's perceptions of self, musical philosophy, rehearsal emphases, musical values and expectations for student behaviour. The teacher's commitment to creating 'choral experiences emphasised a planned and paced use of rehearsal time, developmental exercises, a breadth of balanced repertoire and a focus towards performances; a largely teacher centred approach to pedagogy that created a student approach to 'work' and 'working' that demanded commitment. Students identified that through their rehearsal efforts they achieved a level of quality that surpassed the work of other high school choirs as evidenced by their success in competitions. Students also believed that musical learnings and positive musical values were more prominent than the social outcomes and rewards of participation. Morgan found that an important factor for students was strong group identity and this resulted in conflicts between students who were not as committed to the valued collective endeavour. Morgan concluded from this study that music educators have tremendous power to affect students' musical values, self-perceptions and perceptions of other students.

Another way to encourage skill development is suggested by Massie (1992) who argues that competitions can be used to encourage skill development within high school music programs through designed experiences such as 'Band Olympics'. He states that the focus is upon motivating students to invest time in personal practise when their own intrinsic motivations may not be enough. He suggests competitive strategies such as 'accuracy and speed in scales' or 'the most expressive' or the 'longest notes' and encourages the use of extrinsic rewards such as ribbons and achievement boards to acknowledge and motivate.

Motivation Theories

Band Directors, Jagow (2007) and Ponick (2001), identify that student and community motivation is a key ingredient in successful ensemble music programs. Motivation has also been identified by many music educators as a crucial element in instrumental music education at all levels (Schmidt, 2005; O'Neill and McPherson, 2002; McPherson, 2001). A review of key theories and research that can help understand the complex nature of motivation as it applies to music performance achievement and participation in ensembles is therefore warranted.

Motivation is explained by Brophy (1998) as a theoretical construct that is used to explain the initiation, direction, intensity and persistence of goal-directed behaviour. Ryan and Deci (2000) state that:

> (M)otivation is highly valued because of its consequences: (what) motivation produces. It is therefore of preeminent concern to those in roles such as manager, teacher, religious leader, coach…. and parent that involve mobilizing others to act. (p.69)

The motivational consequences which many music ensemble directors seek when they employ various strategies, such as the use of competitions, may arguably be better quality music performances from their ensemble, so further understanding a student's perspective regarding this experience may provide an insight into the effectiveness of using competition as a motivational strategy.

People are motivated to act by very different types of factors, resulting in a range of experiences, consequences and outcomes. Terms such as intrinsic and extrinsic motivation are regularly used to describe goal motivation. Intrinsic motivation refers to doing an activity for the inherent satisfaction of itself and extrinsic motivation refers to performing an activity in order to attain a separate outcome such as praise, a prize or to avoid a punishment (Ryan and Deci, 2000). Music performance can be both a personal and intrinsic activity while also being influenced (enhanced and diminished) by extrinsic motivational factors such as inter and intra-group competition.

A process model, proposed by Connell (1990), represents motivation as a dynamic, non-linear process which interacts between four domains: self-system (perceptions, thoughts, beliefs, emotions), the social-system (community, school, teachers, peers, parents and siblings), actions (motivated behaviours including learning investment and regulation), and outcomes (learning, achievement and performance). As the self and social systems are continually interacting to influence our actions as well as outcomes, in a reciprocal process, these experiences modify the ongoing influence of the self and social systems.

Socio-Cognitive Motivational Theories

There has been a paradigmatic shift since the 1970s away from motivation theories that emphasize biology or behaviour towards theories that recognise the role of personal cognition and social context. Socio-cognitive theorists regard motivation as a mental or purposive process and less of a mechanistic or reactive response (Pintrich and Schunk, 2002).

Expectancy-value theories provide a framework for understanding why individuals are interested in, or care enough about an activity that they come to regard it as important to them and their future through developing an expectation and the valuing of an activity. Pintrich & Schunk (2002) describe four components: *Attainment value*, referring to how important a student believes it is to do well on a task. *Intrinsic motivation* means the feeling of enjoyment and pleasure the student feels when being involved in the activity. *Extrinsic utility value* relates to the usefulness of the activity to their future goals and career choices. (A student playing an instrument or singing in a choir for the group music making experience will value music performance differently from students who intend to pursue a professional music career.) *Perceived cost* is the consideration of the negative aspects of being involved in the activity. The amount of personal and group practice time required to improve is the perceived cost which may be regarded as not worth the effort because it does not leave sufficient time for other valued activities such as sports or social activities.

Researchers studying academic achievement in mathematics and reading have found that children distinguish between what they like and what they think is important for them. Beliefs regarding their personal competence in a specific field predict how much effort they will exert on the task and their feelings of self-worth (Eccles and Wigfield, 1995). Children's interest in an activity has been identified by researchers as a key to motivation in the early stages of learning (Renninger et al., 1992). This interest has been viewed as individual or situational. Individual interest is reflected by a student's enduring personal disposition for learning in certain domains and topics. Situational interest is generated by specific aspects of the learning environment such as: novelty, relevance, teacher presentations, class work, and assignments. It is suggested that within schools, students develop not just one individual interest, but a network of interests that might be related closely to their learning achievement goals or may be diametrically opposed to the intended learning goals.

Situational interest is regarded as important when children do not exhibit individual interest or are academically unmotivated by a topic. Educators structure a learning environment so as to elicit and enhance student interest, thereby motivating students to persist with important or required learning tasks that may be regarded as tedious or boring. When this situational interest is sustained and transformed into individual interest, children exhibit more enjoyment of learning, work harder, persist for longer and attain higher levels of cognitive functioning and perform to higher academic levels (O'Sullivan, 1997). A case study by Renwick and McPherson (2002) observed the music learning process of a 12 year old clarinet student and found that the individual and situational interest worked in combination to enhance attention and persistence levels when learning a self-chosen piece of music but these declined with repertoire assigned by her instrumental teacher.

Using music ensemble competitions as a form of situational interest to focus students upon styles of practise and rehearsals that demand care, attention and repetition on both a personal and team level is therefore challenging for an ensemble director. To convert this sustained effort into individual and team interest for achieving higher musical performance standards is but one of many competing learning goals students may develop.

The concept of interest and self-determination theory are closely linked through the exploration of intrinsic and extrinsic motivation. Self-determination theory proposes that the level of autonomy a person feels can be mapped along a continuum of extrinsically motivated behaviours. *External regulation* is behaviour controlled solely by the avoidance of punishment or the desire for reward and is closely related to operant theorists such as B. F. Skinner. This behaviour could be exhibited by a music ensemble in which a musical director and their ensemble members are only motivated by rewards such as trophies or prizes.

Introjected regulation involves the developmental internalization of external motivation and is characterised by a person beginning to control their own actions without necessarily identifying or accepting the activity as their own (Ryan and Deci, 2000). This would mean a student participating in the ensemble but not necessarily caring about the musical outcome.

A third more autonomous form of extrinsic motivation is *regulation through identification* in which conscious valuing of a behavioural goal or regulation is accepted or owned and regarded as personally important. This could be represented by pride regarding individuals' own contribution to the sound of the ensemble and a valuing of their contribution towards the group. The most autonomous form is *integrated regulation* where the actions have become congruent with their other values and needs. This form of extrinsic motivation shares many qualities with intrinsic motivation but is considered differently because the actions are done to attain separable outcomes rather than for the inherent enjoyment of the action. An example of this is technical exercises on instruments or voice that are not necessarily pleasurable but promote control and technical facility that are valued as beneficial in order to produce higher standards of musical performance.

Motivation is therefore a complex socio-cognitive construction that can produce powerful consequences should a team activity such as a music ensemble be able to tap into an individual's intrinsic musical motivation and enhance each one's desire for higher musical standards of expression and achievement through extrinsic motivation.

2.3 Research Outline

This chapter describes the design and research gathering process that was undertaken for examining students' perspectives on participating in music ensemble competitions.

2.3.1 Research Design

Methodology

A qualitative research approach was used within this study. This methodology was identified by the researcher as being more likely to provide the type of insight and rich data that would best represent the diversity of student perspectives regarding this learning experience.

A range of qualitative research approaches were considered. These options included:

1. A one year case study of one school ensemble and its director.
2. A one year detailed focus upon a small number of selected students from a range schools.
3. A longitudinal study of selected students encompassing three to five years of secondary schooling.
4. A one year examination of student perspectives drawn from a range of schools and music ensembles that would be sampled at various times during the music ensemble year.

Following consultation with supervisors and a range of secondary school music teachers, option 4 was regarded as more likely to provide the rich and broad data required to provide a range of perspectives regarding music ensemble participation in competitions.

Research Participants

To represent a broad yet detailed range of student perspectives, it was considered important that a large student sample be sought and that they should represent a mixture of secondary school ages, genders, ensemble types and personal musical experiences. To achieve this, the researcher identified that the student sample group would need to be drawn from a number of ensembles, distributed across a number of schools, and directed by a range of ensemble conductors.

Data Gathering Approaches

A range of data gathering methods was considered and included: questionnaires, interviews, journal reflections and observations. It was considered that all of these methods would produce rich and valuable data likely to produce unique and detailed perspectives. However, following consideration of practical issues such as: time and resource limitations for conductors and researcher; as well as the need for providing comparable data between students ranging in gender, age, musical experience, ensemble type and drawn from a variety of secondary school contexts; the following approach was adopted.

Four descriptive questionnaires were developed incorporating structured and unstructured responses to direct and general questions and employing Likert and Guttman type scales. Further personalisation of responses was accommodated through the option of additional explanations and elaborations for many questions.

2.3.2 Research Implementation

Research Timeline

Planning for the research began in early 2004. A research design proposal was developed, ethics approval sought, and potential research participants were identified. In late 2004, a range of secondary schools were approached to participate in the research. The research began in early 2005 with most schools completing the research in late 2005, with a further school completing the research in 2006. Analysis of the research data began in late 2006 and a number of formative presentations and tentative findings were presented at national and international music conferences.

Ethics and Participation Approval to Complete the Study

Ethics approval to conduct this research was supported by the University of Adelaide and permission was sought and granted by the South Australian Department of Education and Children's Services allowing research to be undertaken in Government secondary schools (refer to Appendix 1).

Teachers who participated in the research were provided with a detailed outline as to the nature of this study and the extent of their involvement. Their consent was received prior to the commencement of the study (see Appendix 3).

Students who participated in the research ensembles were invited to be involved in the research through a letter to the students and their parents (see Appendix 2). Consent was received prior to the commencement in the study (see Appendix 3). Students were informed of the nature of the study and given the option to remove themselves from participation at any time should they wish to discontinue their involvement.

Selection of Schools and Research Ensembles

Nine secondary schools within metropolitan Adelaide were invited to participate in the research. This selection was based upon the following: their regular participation in music ensemble competitions, a representation of Government and Non-Government Schools and a demographic factor that included students from a range of low to high socio-economic backgrounds. Six schools replied and four chose to be a part of this research project. Each of these four schools nominated a teacher or teachers who were willing to be involved in the research and who were also conducting music performance ensembles that were planning to participate in music performance competitions during 2005. The range of performance ensembles and number of student participants in each ensemble was determined by the school context.

Details of Research Participants

This included seven teachers and two hundred and sixty-five secondary school students drawn from years 7-12. There were nine performance ensembles, specifically: three choirs, three concert bands and three stage bands

Teacher Details

This research included seven teachers (three female and four male teachers) with ages ranging from their late-20s to late-40s. Only one teacher (M4) had no previous classroom teaching experience, being an instrumental teacher with specialisation in stage band music but possessing several years of secondary school instrumental teaching experience. All teachers identified themselves as having previous experience with ensemble competitions (Tables 1 & 2).

Table 1: Teachers' Background 1

Teacher (F = Female) (M = Male)	Age (Range in Years)	Classroom Teaching (Yrs. Experience)	Ensemble	Competitions (Previous Experience)
F 1	30-40	10-14	Concert Band	5
F 2	22-30	5-9	Choir	4
F 3	30-40	5-9	Choir/Stage Band	8
M 1	40-50	15+	Choir	10+
M 2	40-50	15+	Concert/Stage Band	10+
M 3	30-40	10-14	Concert Band	10+
M 4	22-30	None	Stage Band	3

All teachers had at least three years of ensemble conducting experience with their nominated ensemble, many indicating a significantly higher number of years across a range of ensembles

Table 2: Teachers' Background 2

(In Years of Experience)

Teacher	Choirs	Concert Band	Stage Band	Orchestra	Other
F 1	3	10	1	0	
F 2	5	0	0	0	Rock Bands
F 3	8	4	5	2	
M 1	10+	10+	5	5	Rock/Dixie Jazz
M 2	4	10+	10+	0	
M 3	10+	5	0	0	
M 4	0	0	3	0	Funk/Rock Bands

Student Details

There were two hundred and sixty-five secondary school students who participated in this research, and comprised 163 Female students (61%) and 102 male students (39%). Their ages were predominantly 13 to 17 years (93.9%) with a slightly higher range of representation in the 14 to 15 age group (46%) (Figure 1). Students indicated that 80% had previously participated in an ensemble competition with approximately a quarter of the student sample having had extensive competition experience (10+ times) (Figure 2).

Figure 1: Student Age Breakdown

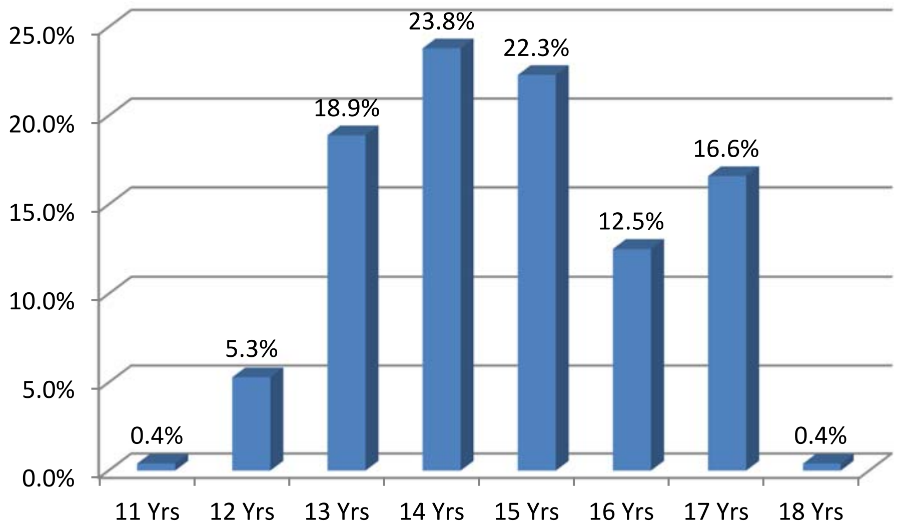
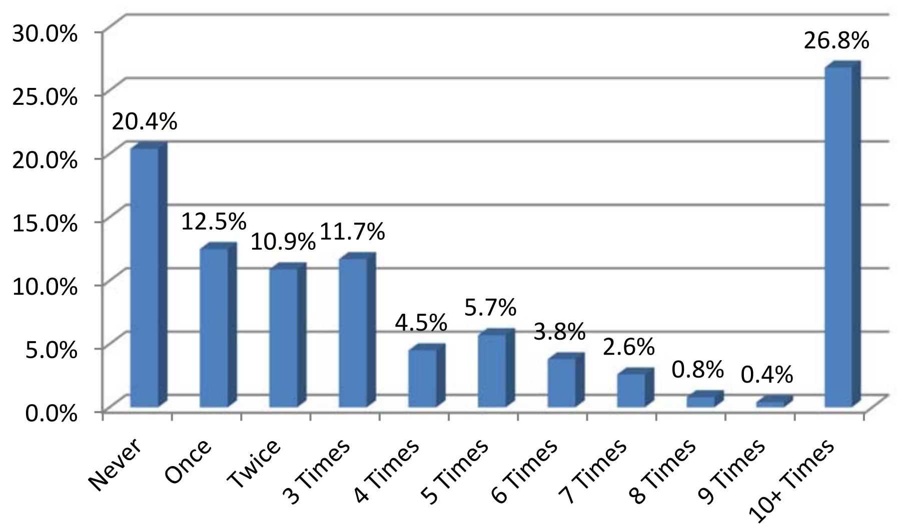


Figure 2: Student Previous Experience Participating in Music Ensemble Competitions



2.3.3 Questionnaires

Purpose of Each Questionnaire

Each questionnaire fulfilled the following purpose:

- The Teacher Learning Design Questionnaire was completed by the ensemble director prior to the students' first questionnaire and established the learning focus of the ensemble.
- The Student Questionnaire One established background attitudes and was pre-competition.
- The Student Questionnaire Two established attitudes post competition (soon after competing).
- The third and final Student Questionnaire Three established the longer term perspective of this competition experience (towards the conclusion of the ensemble year).

Questionnaire Design

A range of question styles were used in each questionnaire. These included: dichotomous – yes/no; multiple choice; importance scales and rating scales check boxes to indicate personal background and prior experience; likert-type scales requiring the participant to indicate the degree to which they agreed with a statement; and open-ended questions that allowed the participant to elaborate in an unstructured written form.

Initial planning for the questionnaires involved a process of comment and feedback from my supervisors in addition to having several teacher colleagues complete the teacher and first student questionnaire. Improvements included formatting suggestions, sequencing of questions, improved clarity and focus in questions, framing response styles to enable simpler coding and analysis, as well as providing the opportunity for unstructured responses. Repeated question themes were also identified for inclusion in the subsequent questionnaires.

The second and third student questionnaires were trialled by Year 9 and Year 11 students (one boy and girl from each year level) to seek further suggestions to improve question clarity, variety, as well as reduce the time it took to complete the questionnaire.

Learning Design Questionnaire (Appendix 4)

This questionnaire provided an insight into the learning design process of the teacher. It aimed to identify their: conducting and teaching experience, views on ensemble competitions, planning for the ensemble year and how they measured ensemble success.

Student Questionnaire One (Appendix 5)

This was completed pre-competition and provided data that established student: background information, attitudes towards the music competition, motivations regarding personal practice and ensemble preparation, perspectives on how they measure success, the musical criteria for judging ensembles, student knowledge of other scheduled performances for the year, what they thought they would learn from participating in this experience.

Student Questionnaire Two (Appendix 6)

This was completed within three weeks of their ensemble competition performance and provided data that established their short term personal perspective regarding the result of the ensemble competition. Students commented upon: personal and group satisfaction with their performance, judging comments and placing results, their personal views on the immediate and long term benefits and disadvantages of participating in this activity, their personal instrumental practice, their motivation towards musical learning since the ensemble competition.

Student Questionnaire Three (Appendix 7)

This was completed towards the end of their ensemble year and established the students' longer term perspective as to how they regarded the ensemble competition experience and how this influenced their personal musical development and that of their ensemble. Students commented upon: personal and group satisfaction throughout the year, their personal instrumental practice, the number of competitive and non-competitive performances, the motivational differences and long term benefits and disadvantages of participating in competitions, any long term influence from the competition adjudicator's comments and their highlights and memories of performing in this ensemble.

2.3.4 Data Compilation

Data Collection

The Learning Design Questionnaire was distributed by email to the ensemble teacher. They were returned by post, fax or email attachment. The three student questionnaires were distributed by the ensemble teacher during an ensemble rehearsal and collected following approximately twenty minutes of completion time. The completed questionnaires were either posted to or collected by the researcher.

Questionnaire Completion Rate

265 students from 9 ensembles completed the initial Questionnaire. From these, 188 students (71%) completed the 2nd Questionnaire, and 114 students (43%) completed the third (Table 3). Of the nine ensembles that commenced the research, only five completed all three questionnaires. Two ensembles did not complete questionnaire two or three and a further two ensembles did not complete questionnaire three.

The reason for this variation in completion rate is attributed to the following circumstances. An ensemble teacher who was involved with two ensembles unexpectedly went on leave soon after the ensemble competition (late term 2) and decided not to continue with the third questionnaire when returning in term four as the ensemble student combination and focus had changed during the teacher's absence. Another teacher concluded the ensemble year at the end of term 3, without completing the third questionnaire data, while another teacher's set of questionnaire three results went 'missing in the post'.

The reason for some students completing only the first and third questionnaire (19) was attributed to student absence during the session(s) when the second questionnaire was completed following the competition. Further student absences contributed to a lower completion rate for the third and final questionnaire.

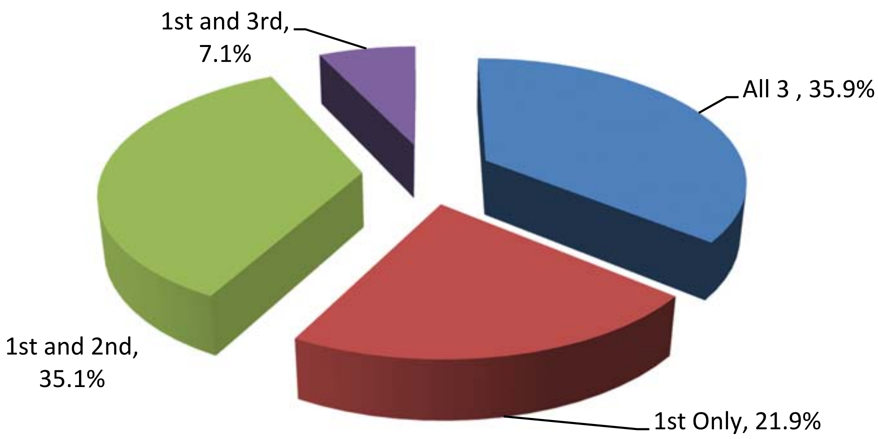
Table 3: Overall Student Questionnaire Completion Rate

Student Questionnaires	Percentage Total	Actual Number	Detail of Questionnaires
Questionnaire 1	100%	265	(All 3) + (1st Only) + (1st and 2nd) + (1st and 3rd)
Questionnaire 2	71%	188	(All 3) + (1st and 2nd)
Questionnaire 3	43%	114	(All 3) + (1st and 3rd)

Table 4: Detail of Student Questionnaire Completion Rate

Questionnaires Completed	Actual Number	Percentage %
All 3	95	35.9 %
1st Only	58	21.9 %
1st and 2nd	93	35.1 %
1st and 3rd	19	7.1 %
TOTAL	265	100 %

Figure 3: Questionnaire Completion Rate



Data Entering and Theming of Comments

The results from the teacher questionnaire and the three separate student questionnaires were compiled, themed, and transcribed into the computer software SPSS v19 by the researcher. A data framework had been created following the trial questionnaire and as data were entered some minor modification to the framework was required. The data were analysed and displayed in descriptive statistics with further insight and detail being provided by the transcribed comments of students. Graphs and table diagrams were formatted using Microsoft Excel using frequency data generated from SPSS.

Additional recoding of student data occurred within some questions in order to make trends more apparent. Data from Student Questionnaire 1, question 5, (Indicate how many hours of personal practise you would do on your instrument (s) each week?) initially allowed 11 possible responses in 2 hour groups from 0 to 20+ hours per week. Recoding consolidated the hours of practise to groups of four hours: 1-4, 5-8, 9-12, 13-16, 17-20 hours respectively. As this was a repeated question in each of the student questionnaires, the division into 6 groups made any trends across the three questionnaires more evident.

Student comments were themed using an emergent approach. Organising categories and indicators of these themes emerged from a close reading of the student comments, taking into account the context of the question. The following five categories of themes were identified: Learning; Competition; Motivation; Music Performance; and Social and Personal. Potential indicators for each of these themes were proposed; however, to best represent the contextual issues that emerged within student comment data for specific questions, additional indicators were added to relevant categories to catch the trend of student responses. The label ‘emergent indicators’ was used to represent this process. The five theme categories and a representation of possible emergent indicators are presented in the following table;

Table 5: Five Categories of Themes

Categories	Emergent Indicators
Learning	Repertoire, Technical Skills, Group Playing Skills, Learning Process
Competition	Judging, Comparison, Prizes
Motivation	Try Harder, Improvement,
Music Performance	Rehearsals, Performances, Concerts,
Social and Personal	Fun, Friendships, Enjoyment, Team Identity, Tours

The way in which categorisation was applied is illustrated in the Table 5. Student Questionnaire 1, question 14 asked “What would indicate that you and your ensemble have had a successful year?” A range of indicators emerged from student responses and these are listed in the Emergent Indicators table header. Three student responses are provided and these have been coded according to the emerged indicators linking to the five categories. For other questions that included student comment, categorisation may have resulted in some indicators being joined or separated, depending upon the emphasis of the question.

Table 6: Coding using Category Themes and Emergent Indicators

Category Themes	Learning		Competition	Motivation		Music Performance	Social and Personal	
Emergent Indicators	Improvement, Sound Good, Play Well	Learning Process	Prizes and Winning	Try Best, Teamwork, Satisfaction	Praise from Director Public	Performance Concerts, Rehearsals	Enjoyment Fun Friendship	Other
Student X:	“Number of awards, group enjoyment, good comments, improved sound”							
	✔		✔		✔		✔	
Student Y:	“People turning up to practise, playing our best, listening to conductor, fun”							
		✔		✔		✔	✔	
Student Z:	Competition placing, we had fun, compliments from audience, tour, learnt heaps							
		✔	✔		✔		✔	✔

2.4 Presentation and Discussion of Data

2.4.1 The Teachers' Learning Design Questionnaire

The information presented here is drawn from teacher responses to the Learning Design Questionnaire. An example of a completed questionnaire is provided as Appendix 4. Because of the small number of teachers involved, their responses are not reported in terms of exact number or percentages. Quotations from comments given to open-ended questions are used as illustrations where appropriate. Further background details for the research teachers are contained in Table 1 and 2, section 2.3.2.

Reasons for Participating in Competitions

The seven teachers who completed this questionnaire all indicated that it was their decision for the music ensemble to participate in a music ensemble competition. Of this group, only three had been in ten or more music ensemble competitions throughout their careers. The reasons they gave for choosing to participate in competitions included; structure and focus, measurable outcomes, motivation for students to strive towards a higher standard of musical performance, repertoire selection, performance venue, hearing other student groups, comparison to other performing groups, and that it was an alternative to school based concerts. These views resonate with earlier research findings that suggest competitions are regarded by directors as providing a combination of beneficial motivational, organisational and social factors likely to improve student's musical performance (Hebert, 2011; Buyer, 2005; Chou, 2001; Ponick, 2001; Hurst, 1994).

What Students Should Learn From Competitions

Common themes that teachers thought students should learn from being in a music ensemble activity were: musical enjoyment, musical co-operation or technical group music making skills (blend/tuning/expression/rhythm), satisfaction of achieving musical performance goals, team and group identity. No teachers mentioned winning, fairness or being better than others as a learning goal. This suggests that for these teachers, the literature advocating for a greater emphasis being placed upon musical learning than winning was being heeded (Ponick, 2001; Parkes, 1983).

Learning Design

Teachers identified that designing learning experiences for their ensemble revolved around planning a yearly performance and term rehearsal schedule. There was an emphasis upon regular performances once or twice a term with repertoire selected to suit the ensemble group's abilities, as well as material suitable for concert and competitions. Building group identity and cohesiveness also required planning social or touring opportunities. Rehearsal strategies included: technical development exercises, sight reading, fun game activities, listening to repertoire, discussing filmed performances, listening/repertoire CD's. Weekly rehearsal times typically ranged from 45 minutes to 90 minutes, with the most common being 60 minutes duration. Four of the seven teachers added that they sometimes would organise additional rehearsals depending upon the upcoming performance need. These learning design considerations are regarded as 'standard' practice within developing band program literature (Jagow, 2007) as well as research exploring the culture of secondary school music ensemble programs (Hebert, 2011; Morgan, 1992).

Indicators of Ensemble Success

The ensemble directors listed the following indicators for measuring if the ensemble had had a successful year: happy enthusiastic students and parents, improving standard of musicianship in rehearsal and performance, group pride and musical teamwork, regular student attendance. None mentioned competition placings. These views suggest that these ensemble teachers consider a range of factors when they reflect upon whether it was a successful ensemble year. Establishing and maintaining a supportive social environment within the band and school community was highly valued by these ensemble teachers and concurs with a range of ensemble literature (Jagow, 2007; Ponick, 2001; Humphreys, 1992). The mention of maintaining regular student attendance at rehearsals and performances is of interest to this research. Research literature suggests maintaining student motivation for continued participation against other competing priorities is a challenge for ensemble directors and that participation in competitions can assist with sustaining student motivation to attend rehearsals (Hebert, 2011; Chou, 2001).

Teacher Attitudes toward Music Competitions

All directors agreed that competitions were not essential to their music ensemble program. However, they were evenly divided as to the importance of competitions to the music program. This indicates to the researcher that participation in competitions is not a major focus for these directors, and, as suggested by Meyers (2011), other organisational considerations determine participation. Five of the seven directors thought that competitions motivated students to attend rehearsals, echoing the findings of Hebert (2011); however, only three agreed that music ensemble competitions improved musicianship, with the other four indicating they were unsure. Although four of the seven directors believed they would win prizes, none claimed they were competing to win and all indicated that they wanted the ensemble students to do their best and enjoy the experience. This perspective suggests to the researcher that the ensemble director's intentions for designing musical experiences that include participation in ensemble competitions is driven less by a need to be competitive and more by the need to provide learning motivation.

Student Motivation and Competitive and Non-Competitive Performances

Five of the seven directors agreed that students were more motivated by competitive public performances than by non-competitive performances while the other two directors responded that they were unsure. Several directors recognised that their own attitudes and views, as well as their comments within rehearsals probably influenced student viewpoints regarding competition, echoing research by Morgan (1992).

> Depends on my emphasis. (It's) easier to motivate students to put the time and energy into practice and preparation with talk of a competition judging than a general concert. (Teacher M2)

> I think my emphasis gets reflected by the students and they definitely do seem to focus better preparing for an adjudicated competition than only a concert. (Teacher F3)

Two other directors indicated that competitions created a more intense rehearsal focus and a greater degree of preparation; stimulating greater student motivation and application than would otherwise occur.

> All performances provide focus, competitions seem to justify and motivate a short term more intense focus. (Teacher M4)

> I believe we reach a higher musical standard not because of the competition but because of the preparation towards the competition. General performances do not have the same 'edge' of being judged and compared so team pride motivates students to try harder for a specific goal. (Teacher M1)

These views resonate with previous research findings which suggest that students do approach competitive and non-competitive performances differently (Austin, 1988), and that the learning environment created through the participation in competitions was regarded by ensemble directors as producing positive musical benefits (Hebert, 2011). Other directors considered that music tours proved more effective in creating student motivation than competitive and non-competitive performances echoing research findings suggesting that the same levels of motivation may be achieved in non-competitive settings (Austin, 1990; Burnsed and Sochinski, 1983).

> I believe tours are the most motivational, followed by competitions and festivals. Anything coupled with a tour always works best for motivation. (Teacher F2)

> Linking tours to a competition or general performance seems to have the most motivation to practise and improve. (Teacher F1)

One director identified school community support for competition performances was greater than for non-competitive performances.

> When it's a competition most parents and the school regard it as pretty important so I can organise more rehearsals as well as get students out of other lessons to rehearse or perform (in a competition). (Teacher M3)

Another director suggested that motivation for non-competitive performances could also be achieved by promoting particular events as important and significant; resonating the views of Austin (1990) and Burnsed (1983).

> Competitions make it all seem really necessary but if you build-up something like your annual Town Hall concert and make it really important so that you have extra rehearsals and promote it in newsletters and stuff I reckon you get similar motivation from everyone just without the judging. (Teacher F3)

2.4.2 Students' Perspective Prior to Competition (Questionnaire 1)

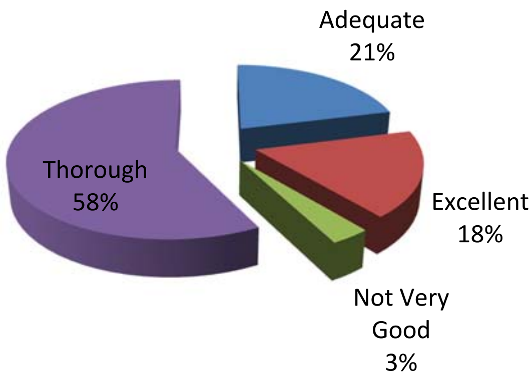
The data presented in this section represent the responses of 265 students to Student Questionnaire 1. An example of an anonymous completed questionnaire is provided as Appendix 5. Frequency analysis was applied to the data, so that the results are discussed in terms of numbers and percentages. In the case of open-ended questions, illustrative quotes are given where appropriate.

Attitude towards Competing Pre-Competition

Students involved in this research study indicated a high degree of satisfaction regarding their ensemble's preparation for the competition. This was regarded as indicating positive student confidence and anticipation towards the event.

Figure 4: How would you describe your ensembles preparation for the competition?

(Questionnaire 1-9)



Surprisingly, the majority of students did not believe their ensemble director was making them go into the competition (Figure 5). When asked if they preferred that they were not competing, 81% disagreed with this statement. This suggests that a significant majority of students were supportive of participating in a music ensemble competition, possibly embracing the choice as their own. This could be interpreted as suggesting the motivational state of 'regulation through identification'. It also supports other research findings that suggest the more an ensemble participates in the competition process (in this instance rehearsing towards a competition), the more they value it (Humphrey, May and Nelson, 1992).

Figure 5: Conductor is making us go into the competition

(Questionnaire 1-10d)

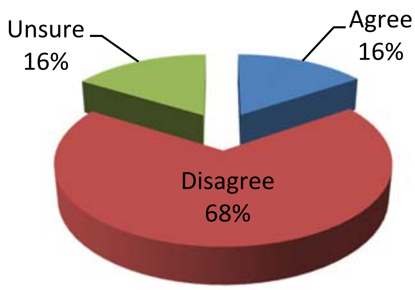
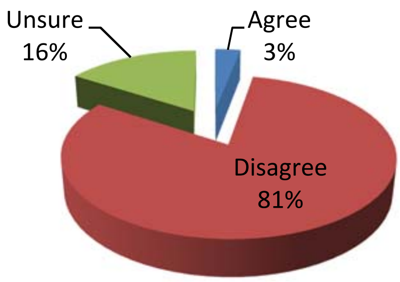


Figure 6: Prefer we weren't competing

(Questionnaire 1-10e)



Perspectives regarding Motivation Pre-Competition

Much of the research literature claimed that directors regularly used competitions as an extrinsic motivator to inspire and focus musical progress (Schmidt, 2005; Ponick, 2001; Hurst, 1994). In this pre-competition questionnaire, the majority of student responses supported the effectiveness of this motivational strategy. Students agreed that being in an ensemble competition motivated them to practise their instrument more (65%) and attend rehearsals (83%), as well as improve their playing (88%). There was also significant support (89%) for competitions motivating students to want to be part of a team (89%).

Figure 7: Motivates me to practise my instrument more (Questionnaire 1-11a)

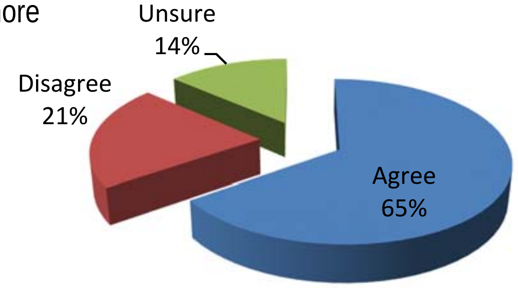


Figure 8: Motivates me to turn up for rehearsals (Questionnaire 1-11d)

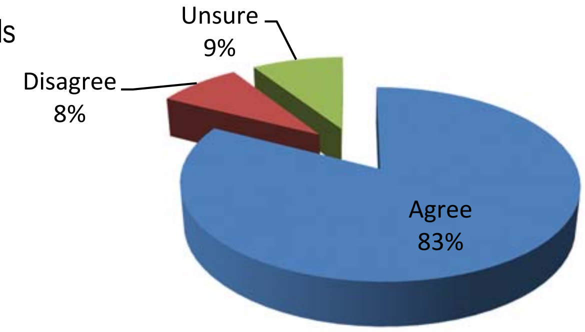


Figure 9: Motivates me to improve my playing (Questionnaire 1-11h)

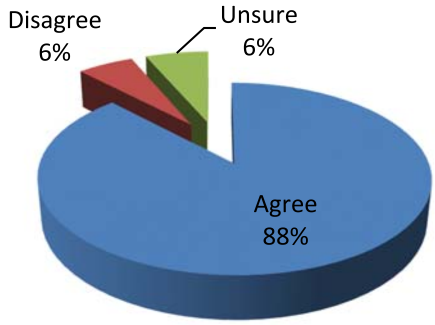
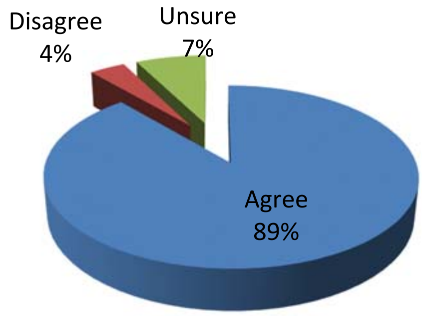


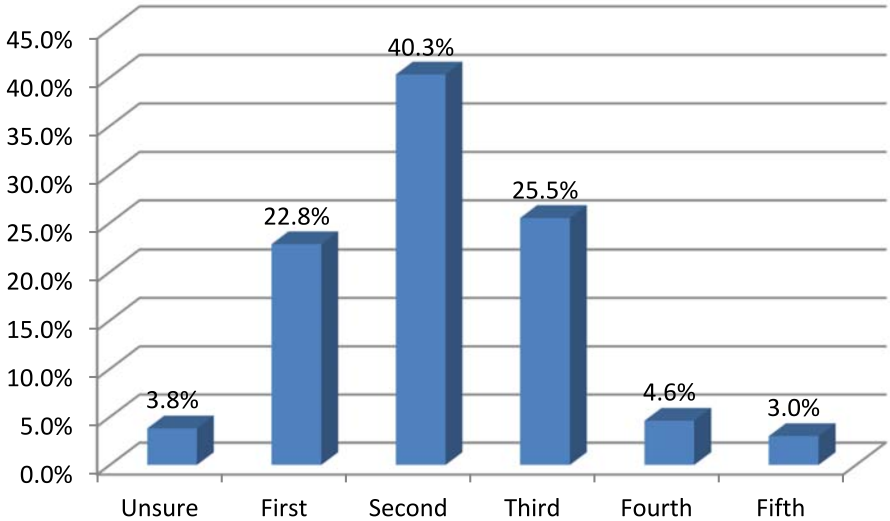
Figure 10: Motivates me to want to be part of a team (Questionnaire 1-11k)



Expected Competition Placing Pre-Competition

Students were very positive regarding how they thought their ensemble would be placed, with the majority anticipating that they would achieve a second or third place (65.8%), should they be competing against four other ensembles. This expectancy of ‘respectable’ success suggests a perspective that achieving a ‘middle’ placing was important to the majority of students. Although first place was desirable, finishing in the lower positions was not considered likely.

Figure 11: What position they thought their ensemble would be awarded (Questionnaire 1-13)



The students were evenly divided as to whether they were competing to win prizes (Figure 12). However, there was an overwhelming support (94%) for doing their best in the competition and enjoying the experience (Figure 13). This perspective was reinforced by the majority of students disagreeing with the statement that winning at all costs was important (Figure 14).

Figure 12: Ensemble is competing to win prizes?

(Questionnaire 1-10a)

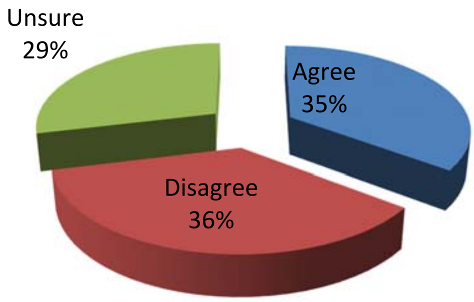


Figure 13: Do our best and enjoy the experience

(Questionnaire 1-10b)

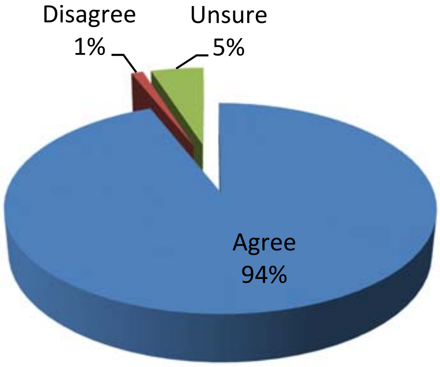
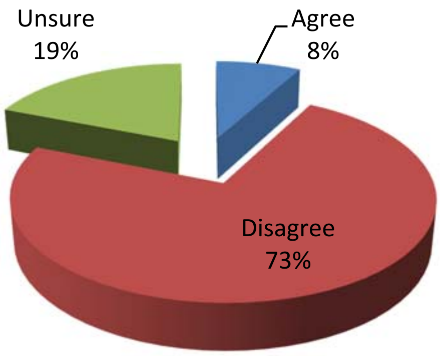


Figure 14: Motivates me to win at all costs

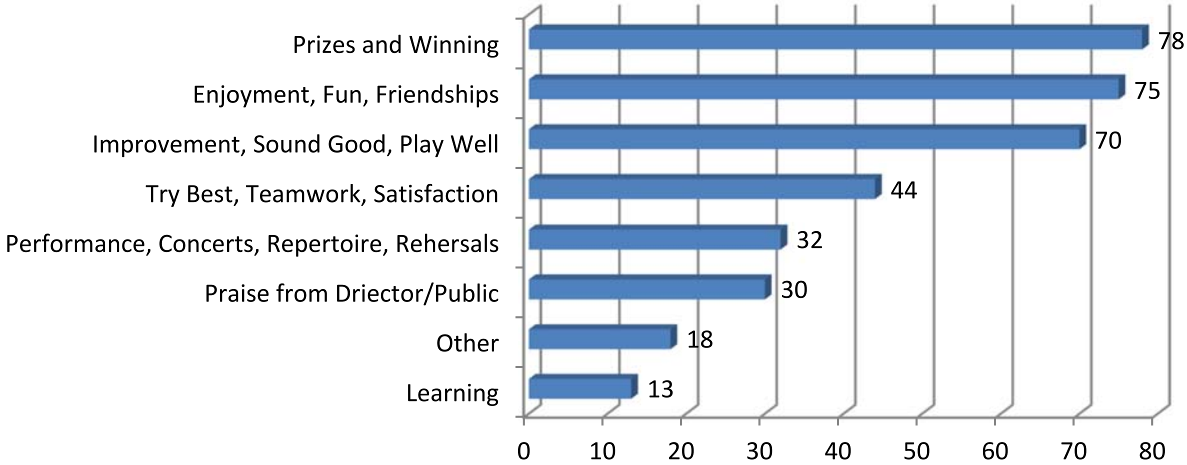
(Questionnaire 1-11j)



Indicators of a Successful Ensemble Year Pre-Competition

The students measured the success of an ensemble year by such things as 'prizes and winning', 'enjoyment, fun and friendships' and 'improvement, sounding good and playing well'. This suggests that there was an anticipation of 'doing well' within a measurable competition. At the same time they maintained a balanced perspective by recognising the importance of "having fun, building friendships and enjoyment", while improving musically, "playing well and sounding good" (quotes from students comments). Students indicated in the next tier of measurements that they valued the social and motivational aspects of teamwork and trying their best, performing and playing enjoyable repertoire as well as praise from the public and their ensemble director. The individual category for 'learning' and its lower response rate could be because learning was implied within other categories, such as 'improvement, sounding good and playing well'.

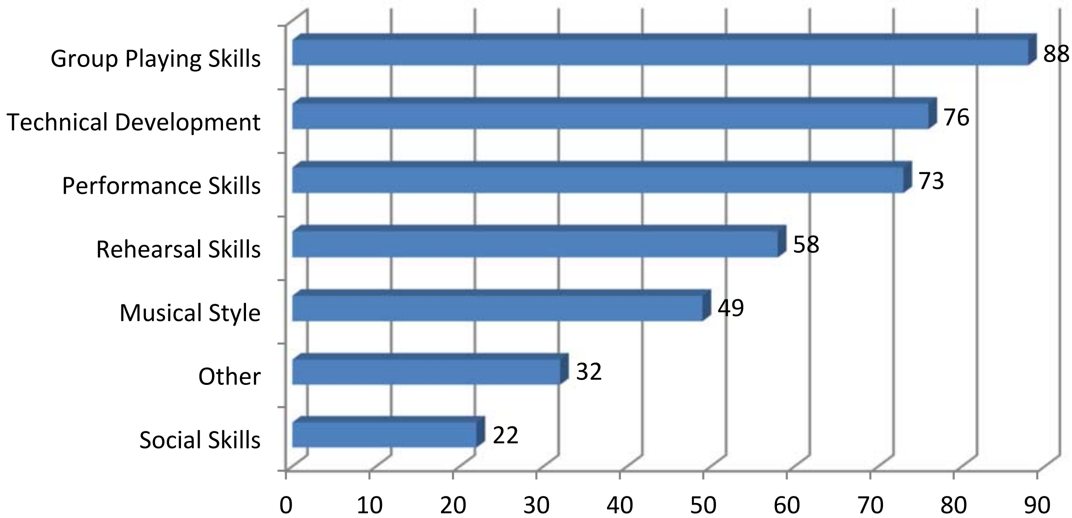
Figure 15: What would indicate that you and your ensemble have had a successful year? (Questionnaire 1-14) n=265 (students may nominate several indicators of which all are recorded)



Students' Perspective on Ensemble Learning Pre-Competition

From the data sample of 265 students, the most frequently identified things they thought they should be learning from being in an ensemble were 'group playing/singing skills' (88) ,' technical development' (76) and 'performance (73)' and 'rehearsal skills' (58). This perspective is important and encouraging as these indicators suggest students valued the learning of music playing and performing skills above the 'extra-musical' skills of 'self-discipline' 'responsibility' and 'self-esteem' that were often valued by principals, administrators and parents (Rogers, 1985; Humphreys, May and Nelson, 1992).

Figure 16: List the things you think you should be learning from being in this ensemble (Questionnaire 1-15) n=265 (students may nominate several indicators of which all are recorded)



2.4.3 Students' Perspective Following the Competition (Questionnaire 2)

This section presents a frequency analysis of the responses of 188 students to Student Questionnaire 2, completed just a few weeks following the competition (Post-Competition). An example of an anonymous completed questionnaire is provided as Appendix 6. The results are discussed in terms of percentages and frequency.

Performance Satisfaction (Post-Competition)

Following their competition performance, the majority of students indicated that they were satisfied or very satisfied with their ensemble's performance and although less judged their personal performance at the 'very satisfied' level, the sum of the two satisfaction levels were similar. This positive perspective supports the research view that students experience satisfaction from performing music publicly, whether it is a competitive or non-competitive situation (Head, 1983).

Figure 17: How satisfied were you with your ensembles performance in the competition? (Questionnaire 2-1)

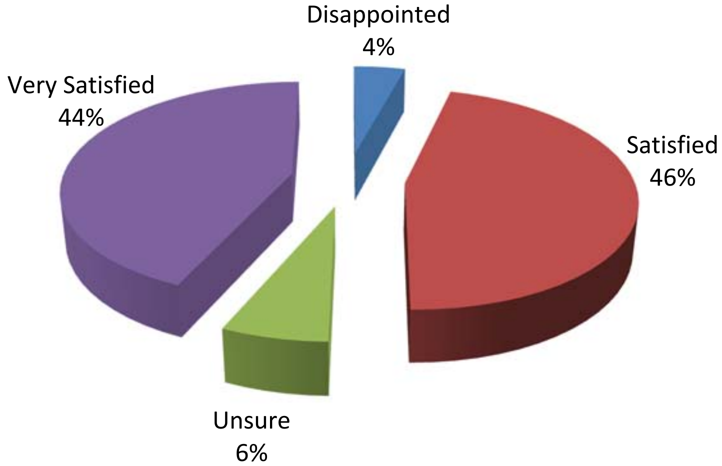
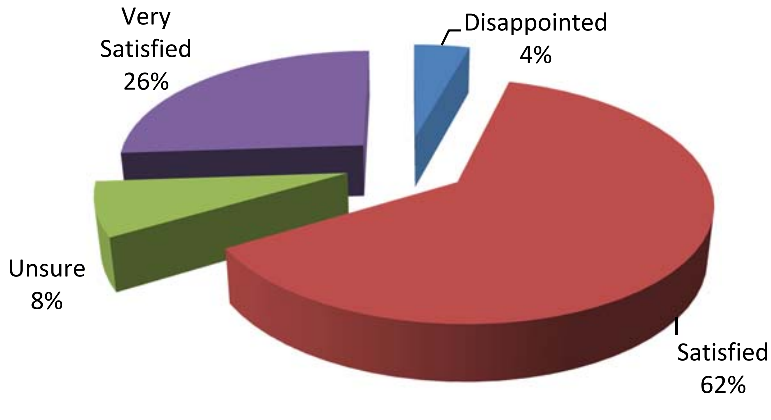


Figure 18: How satisfied were you with your own performance in the ensemble competition (Questionnaire 2-2)



Competitions as an Immediate Benefit (Post-Competition)

A significant majority of students (78%) indicated that they thought the ensemble competition had been an immediate benefit to their ensemble. Gaining 'experience and confidence' was most valued, while 'trying harder', 'improvement' and providing a 'focus or goal' were also valued. A range of student comments included:

> Motivated us to do our best, raised focus and concentration levels. (Year 12 student)
>
> Indicates our standard, inspires for improvement. (Year 11 student)
>
> We try harder when we compete. (Year 11 student)
>
> Great experience and fun. (Year 10 student)
>
> It's another performance that just happens to be a competition. (Year 11 student)
>
> Provides motivation, purpose to practise. (Year 9 student)
>
> Everyone did more work like listening to repertoire CD's and turning up for sectionals and lots more practising so that made a big difference. (Year 10 student)

Figure 19: Do you believe the competition has been an immediate benefit to your ensemble? (Questionnaire 2-3)

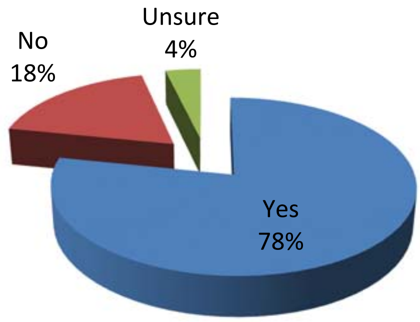
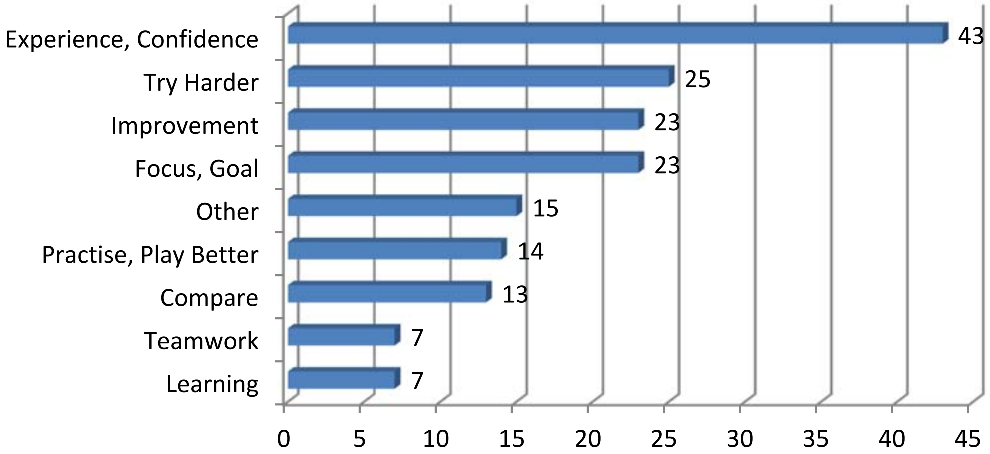


Figure 20: Themed comments- competition has been an immediate benefit to your ensemble? n=188 (students may nominate several indicators of which all are recorded)



Competitions as a Long Term Benefit (Post-Competition)

Asked to comment on whether playing in the competition would be of any long term benefit to their ensemble, the majority of students (58%) agreed that it would be. However, there was an increase in the number of students who were unsure what impact it may have. A range of student comments include:

> Hopefully, we will want to stay at that level or even better. (Year 11 student)
>
> New music develops our musical abilities, gives us something to work towards. (Year 10 student)
>
> It helped but we still need more practice. (Year 9 Student)
>
> Only maintain or keep improving if we keep having extra rehearsals. (Year 12 student)
>
> Added pressure to future performances due to higher expectations. (Year 11 student)
>
> Gives us knowledge and experience and can be applied to other competitions and performances. (Year 11 student)

Figure 21: Do you believe the competition will be of any long term benefit to your ensemble? (Questionnaire 2-4)

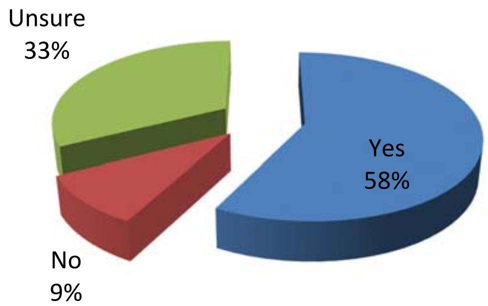
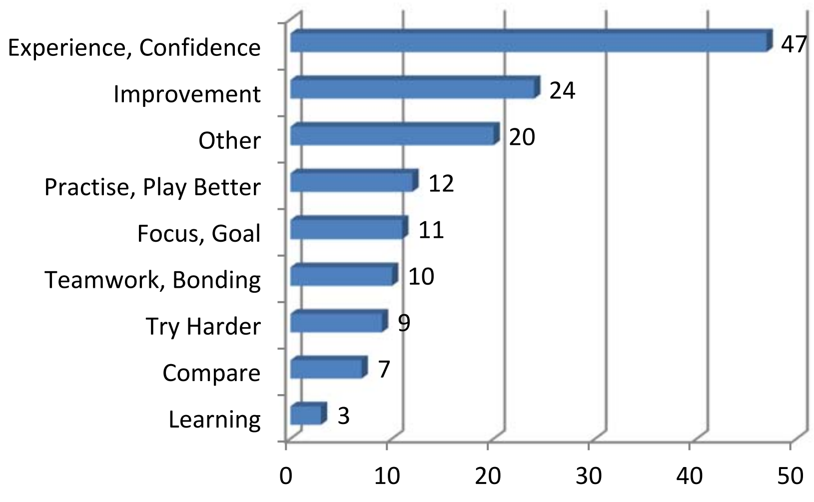


Figure 22: Themed Comments- Will competition be of long term benefit to your ensemble? n=188 (students may nominate several indicators of which all are recorded)



Attitude towards Competing (Post-Competition)

The majority of students (66%) indicated that this competition had made them more enthusiastic about being in other ensemble competitions. The No (17%) and Unsure (17%) responses suggest that not all students are going to become more enthusiastic about being in other competitions. Themed student comments explaining why they gave their answer identified that the 'fun and excitement', 'competitive' spirit and desire to 'improve' were all important considerations. The following range of student comments summarises their views with the final two quotes being indicative of the more negative views.

> Always fun performing in front of an audience but competition adds edge. (Year 10 student)
>
> Motivates and builds confidence using peoples competitive spirit. (Year 12 student)
>
> Excitement afterwards and having something to work towards was really good. (Year 11 student)
>
> Fun, enjoyed listening to other bands. (Year 8 student)
>
> It motivates us to try harder during rehearsals and pay more attention to musical phrases and stuff which makes us sound better. (Year 9 student)
>
> Enjoy casual performance rather than stressfulness of a competition. (Year 10 student)
>
> Competing is fun but not this competition. (Year 11 student)

Figure 23: Has performing in this competition made you more enthusiastic about performing in other competitions?

(Questionnaire 2-5)

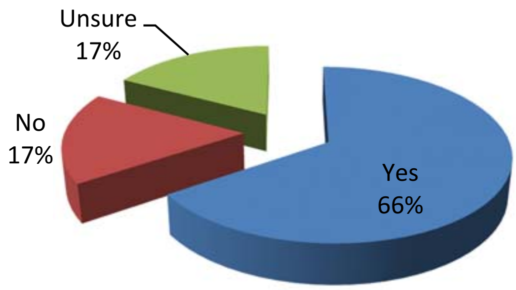
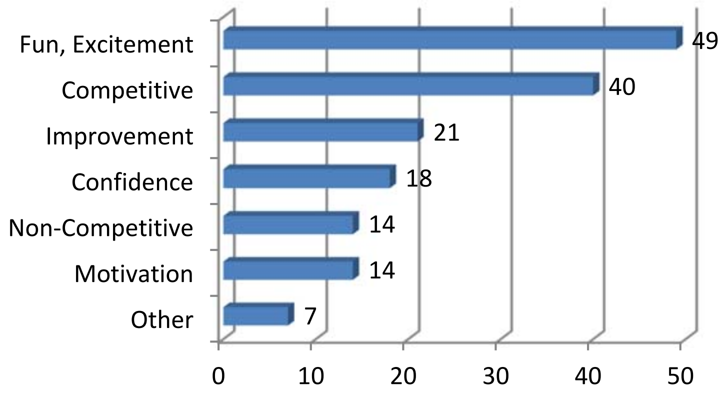


Figure 24: Themed comments- Has this competition made you more enthusiastic about performing in other competitions?

n=188 (students may nominate several indicators of which all are recorded)



Student responses to a negative question suggesting their ensemble was not interested in competitions indicate a large majority of students believe their ensembles were still interested in participating in ensemble competitions. There was also overwhelming agreement that their ensemble wanted to keep improving since the competition.

Figure 25: Not interested in competitions?

(Questionnaire 2-13a)

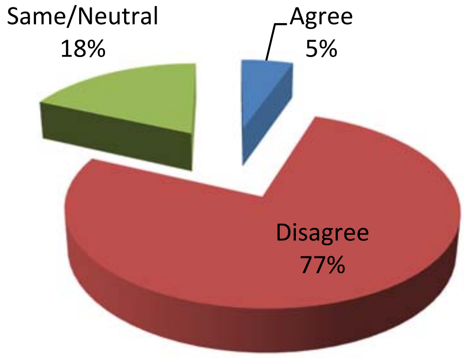
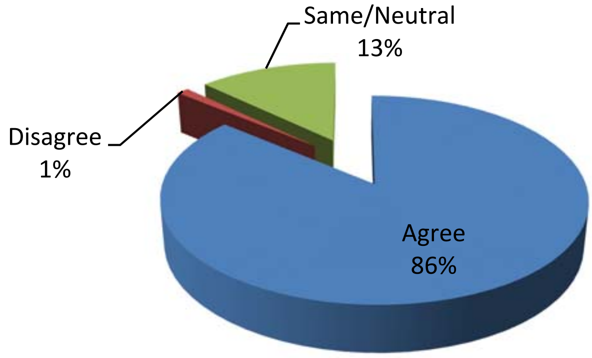


Figure 26: Want to keep improving?

(Questionnaire 2-13b)



An overwhelming majority of students indicated that rehearsals had not become worse since participating in the competition (92%) and two-thirds disagreed (61%) that their ensemble disliked rehearsing since the competition.

Figure 27: Our rehearsals are worse (Questionnaire 2-13c)

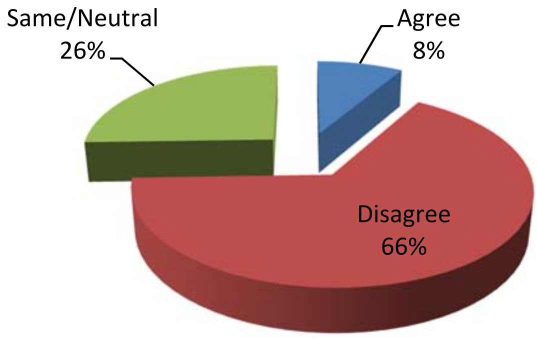
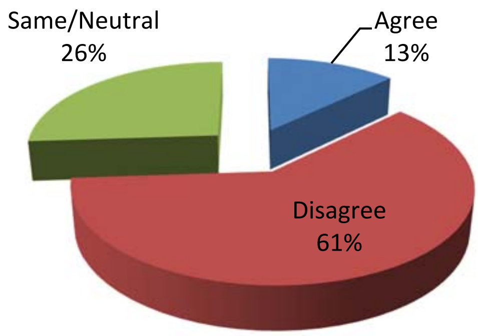


Figure 28: Dislike rehearsing? (Questionnaire 2-13d)



There was a divided view regarding whether students believed their ensemble was tired of the same songs and tunes. Other ensemble competition research has found that the intense time focus upon specific repertoire prior to a competition is regarded as one of the negative aspects of participating (Hebert, 2011). The increased rehearsal focus typical of preparation prior to ensemble competitions tends to raise musical performance standards (Hebert, 2011). It is of interest to note that over two thirds of students believed their ensemble played music better since the ensemble competition – supporting the earlier finding.

Figure 29: Tired of same songs and tunes? (Questionnaire 2-13e)

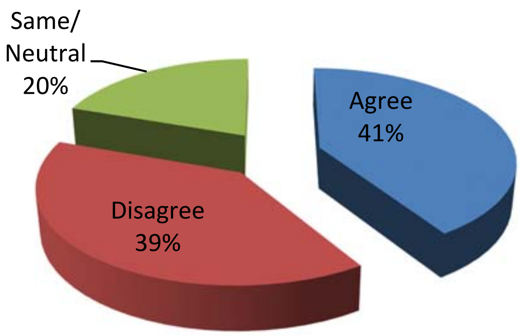
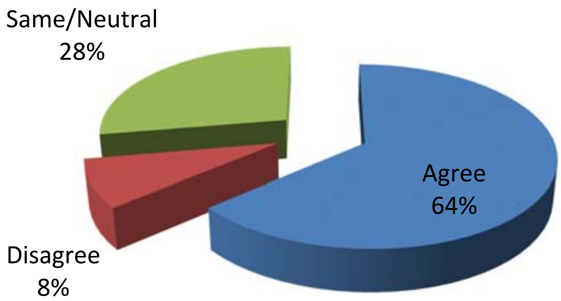


Figure 30: We play music better

(Questionnaire 2-13f)



Perspectives regarding Competition Placing (Post-Competition)

The score and ranking position which ensembles receive are important measurements of ensemble achievement (Austin, 1988). Two thirds (61%) of the students in this research agreed that their ensemble preparation justified the position they were awarded. Student comments offered interesting perspectives on the balance between their efforts and performance and the comparative nature of competition. Many believed that they had 'practised well' and 'tried hard' but that 'more effort' could have been put in. Some found issues with the adjudication process, while fewer thought that the other ensembles were just 'better'. A range of student perspectives were:

> Did not work as hard compared to previous year but still performed very well. (Year 11 student)
>
> We practised and rehearsed a lot with extra sectionals and some weekends so it's the best we could do given the time. (Year 10 student)
>
> Too rushed, last minute, unfocused, didn't deserve as well as we did. (Year 12 student)
>
> Cause we had talked about how we were being marked, the gradings made more sense. (Year 9 student)
>
> The hard work rehearsing got us a good place, but the other ensembles were just better. (Year 9 student)
>
> We were well prepared and paid lots of attention to technique stuff so we deserved better. (Year 10 student)
>
> Worked really hard, adjudicators' mark didn't go with their comments. (Year 11 student)

Figure 31: Do you believe your ensemble preparation justified the position they were awarded? (Questionnaire 2-8)

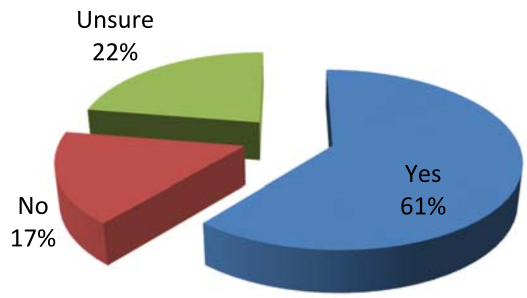
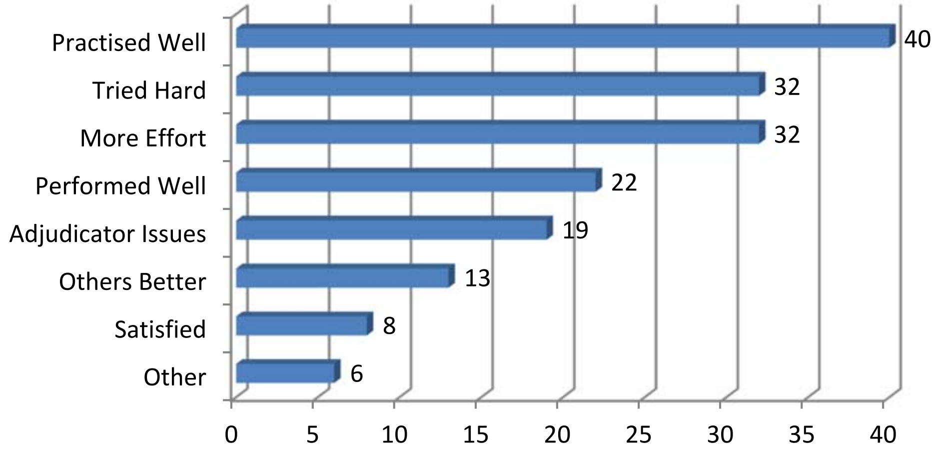


Figure 32: Themed comments- ensemble preparation justified the position they were awarded?



Nearly half the students indicated they believed their ensemble deserved a significantly higher placing position, following the competition, as compared to the placing they expected prior to the competition (see 2.4.2). It is unclear why this perspective has emerged but a speculative reason could be that students felt that they had performed very well or at their best on this occasion. Almost two thirds of respondents (60%) indicated that they were either satisfied or very satisfied with the adjudicator's comments. The large 'Unsure' response may also include students that never heard the adjudicator's comments.

Figure 33: What position do you think your ensemble should have been awarded? (Questionnaire 2-11)

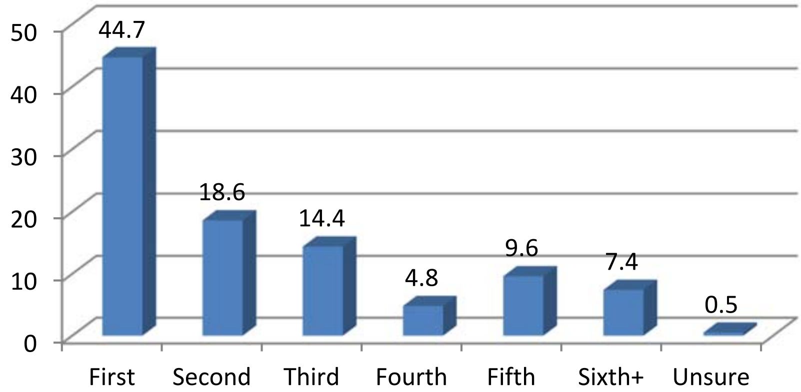
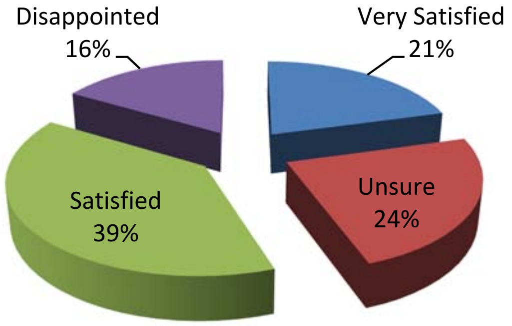


Figure 34: How did you feel when you read or heard the adjudicators' comments?

(Questionnaire 2-10)



Indicators of a Successful Ensemble Year (Post-Competition)

There was a noticeable change with regard to student comments on how they measured ensemble success pre-competition (see section 2.4.2: Figure 15) and post-competition. There was still strong support for 'prizes and winning' as well as 'improvement, sounding good and playing well'. However, the social and pleasurable indicators such as 'enjoyment, fun and friendships' were less frequently mentioned. The reduced number of 77 questionnaire participants has had an impact upon the overall frequency number but otherwise, the relative distribution (excluding 'enjoyment, fun, friendships') remains similar between pre and post-competition comments.

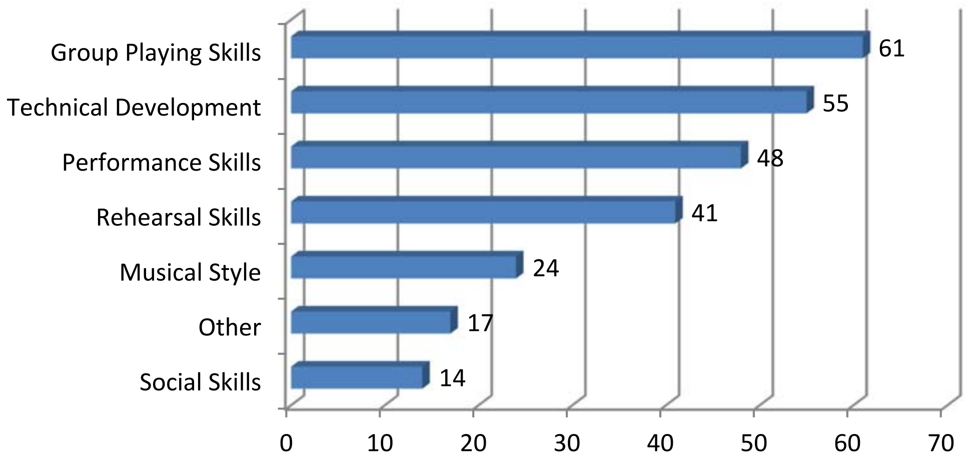
Figure 35: What would indicate that you and your ensemble have had a successful year?

(Questionnaire 2.15) n=188 (students may nominate several indicators of which all are recorded)

Students Perspectives on Ensemble Learning (Post-Competition)

From the data sample of 188 students, the most frequently identified things which they thought they should be learning from being in an ensemble were ‘group playing/singing skills’ (61), ’technical development’ (55), and ‘performance (48)’ and ‘rehearsal skills’ (41). The reduction of 77 survey participants has had an impact upon the overall frequency number, but the relative distribution remains similar between pre and post-competition comments (see section 2.4.2: Figure 16).

Figure 36: List the things you think you should be learning from being in this ensemble. (Questionnaire 2-16) n=188 (students may nominate several indicators of which all are recorded)



2.4.4 Students' Perspective at Conclusion of Ensemble Year (Questionnaire 3)

This section presents the response of the 114 students who completed Student Questionnaire 3. An example of an anonymous completed questionnaire is provided as Appendix 7. The results of the frequency analysis are discussed in terms of percentages.

Performance Satisfaction – Conclusion of Ensemble Year

Students indicated a very high level of satisfaction with their ensemble and their own performance throughout each of the three questionnaires.

Figure 37: How satisfied were you with your ensembles' performance throughout the year?

(Questionnaire 3-1)

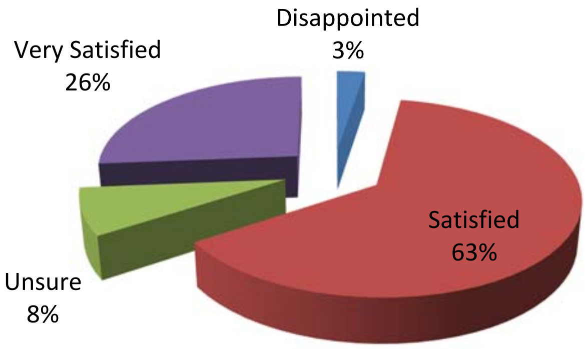
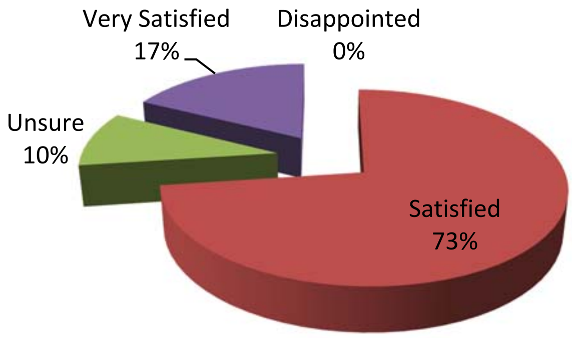


Figure 38: How satisfied were you with your own performance throughout the year?

(Questionnaire 3-2)

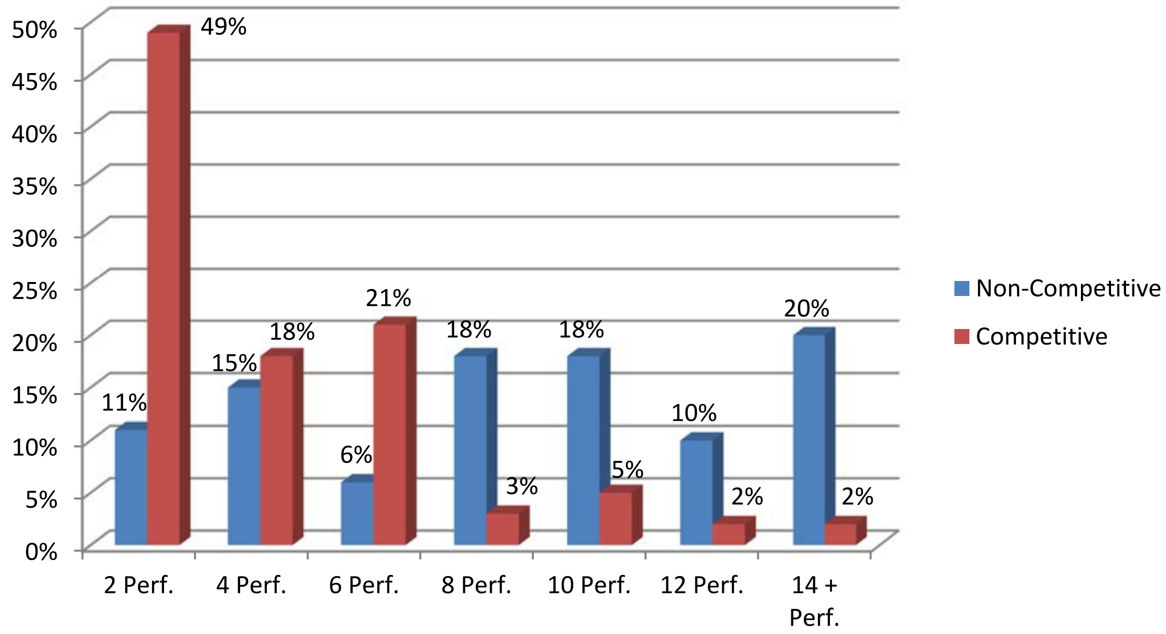


Number of Non-Competitive and Competitive Performances - Conclusion of Ensemble Year

Of particular interest is the number of non-competitive and competitive performances students experienced with data heavily favouring non-competitive performances. As students were likely to have participated within a range of ensembles throughout the year, student comments were based upon their performances in any ensemble. The data show that 90% of competitive performances were fewer than 6 throughout the year, whereas 60% of students indicated that they participated in 8 to 14 non-competitive performances or more throughout the year. These data indicate that from this sample of students, the majority of students experienced two to three-times more non-competitive performances than competitive.

Figure 39: How many competitive and non-competitive performances have you participated in throughout the year

(Questionnaire 3-3 & 3-4)



Ensemble Musical Level - Conclusion of Ensemble Year

Approximately half (49%) of the 114 student's responding to the third questionnaire believed their ensemble would not have reached their present musical level without having performed in a competition. The sizeable 31% 'Unsure' response highlights the difficulty when considering a hypothetical situation (not being in a competition) and considering if their ensemble would be at the same musical level without their actual competition influenced experience. Seventy-four students explained their responses and the theming highlighted that a competition experience seems to 'Provides Motivation' to 'Practise More'. A sample of student responses includes:

> We would not have rehearsed as much. (Year 10 student)

> Had a short-term minor effect on our improvement 'cause we had longer rehearsals and were more focused. (Year 10 student)

> Tend to practise more away from band / more rehearsals = more time for attention to musical detail. (Year 10 student)

People take competitions more seriously 'cause of judging. (Year 11 student)

Not as much focus or attendance without a competition. (Year 11 student)

Don't need to compete to play well. (Year 12 student)

Figure 40: Do you believe your ensemble would have reached its present musical level without performing in a competition?

(Questionnaire 3-5)

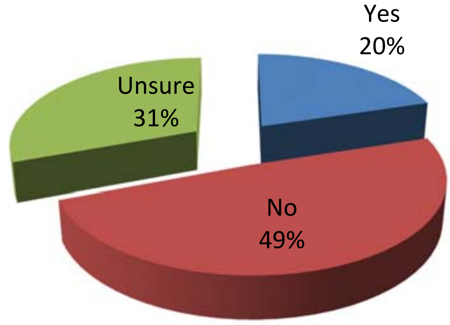
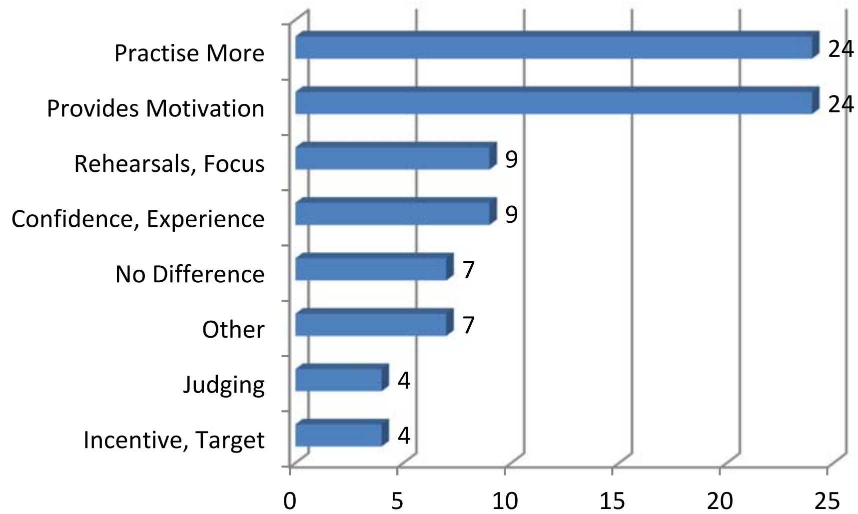


Figure 41: Themed comments- would ensemble have reached its present musical level without performing in a competition?

(Questionnaire 3-5) n=114 (students may nominate several indicators of which all are recorded)



Benefits of Participating in Ensemble Competitions - Conclusion of Ensemble Year

One hundred and eight students provided a range of comments about what they considered to be the benefits of participating in ensemble competitions.

Theming of responses revealed 'confidence and experience' was the most frequently mentioned benefit, followed by the ability to 'compare and measure' their ensemble against others. 'Musical improvement', 'social interaction' with other groups, providing a 'target or focus' as well as 'enjoyment' were also valued. Other identified benefits included 'motivation', providing a reason for 'extra rehearsals and preparation' as well as the building of 'team identity' and public 'recognition'

Figure 42: What do you now consider to be the benefits of participating in ensemble competitions?

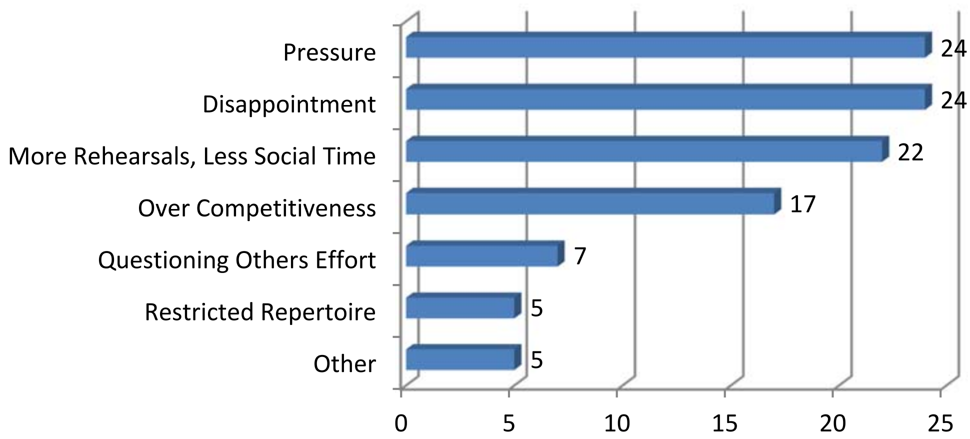
(Questionnaire 3-6) n=114 (students may nominate several indicators of which all are recorded)

Disadvantages of Participating in Ensemble Competitions - Conclusion of Ensemble Year

There was a range of comments about what participants considered to be the disadvantages of participating in ensemble competitions. The most mentioned were 'pressure' and 'disappointment' of losing or not achieving your goals, as well as 'less social time' due to an increase in rehearsals. An emphasis on 'over-competitiveness' was also of concern while 'questioning others' effort' and 'restricting repertoire' were also regarded as disadvantages.

Figure 43: What do you now consider to be the disadvantages of participating in ensemble competitions?

(Questionnaire 3-7) n=114 (students may nominate several indicators of which all are recorded)



Recommend Others to Participate in Ensemble Competitions - Conclusion of Ensemble Year

A majority of students (81%) indicated that they would recommend that other students participate in ensemble competitions. The most cited reasons were that competitions were ‘a good experience’, ‘fun’ and leading to ‘enjoyment’ ‘. A range of student comments highlight this.

> Great experience hearing other bands and judges’ comments and you play better. (Year 10 student)
>
> Gives you focus to turn up to rehearsals and helps you improve ‘cause it’s fun. (Year 10 student)
>
> Fun experience that helps you reach better levels and better quality. (Year 10 student)
>
> Each performance is good for confidence and learning, competitive or not. (Year 11 student)
>
> It’s fun, you get to listen critically to other bands as well as meet them and chat. (Year 11 student)

Figure 44: Would you recommend other students to participate in ensemble competitions?

(Questionnaire 3-8)

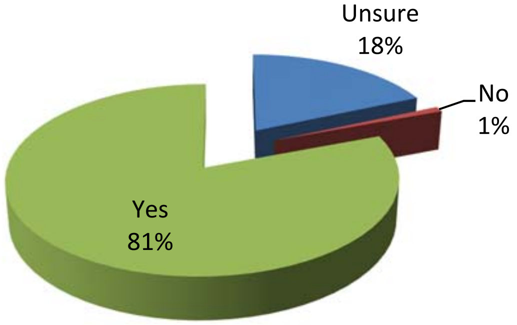
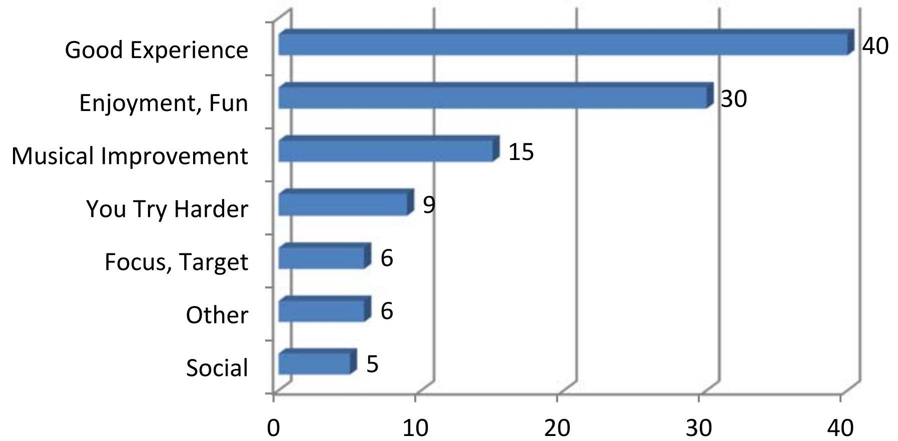


Figure 45: Themed comments- Would you recommend other students to participate in ensemble competitions?

(Questionnaire 3-8) n=114 (students may nominate several indicators of which all are recorded)



Motivation regarding Non-Competitive and Competitive Performances – Conclusion of Ensemble Year

Almost half of students (47%) did find competitive performances more motivating than non-competitive performances. The themed comments suggest that both performances are regarded as important and although many competitive comments were made, these were balanced by an equal number of non-competitive views. The pressure of competitions was regarded as being both a good and bad thing. 'Who you were competing against' was also a motivating issue for some students. Performing for 'Relaxation and Fun' was also regarded as important.

> Competitions are built up to be important and you want to do your best because you're being judged'. (Year 9 student)
>
> The pressure of being judged can make you try harder to get it right. (Year 9 student)
>
> Comparing performance scores to other schools is more motivating. (Year 10 student)
>
> Every performance should be done to your best efforts. (Year 11 student)
>
> Hard to focus on singing your best when the pressure of competing is ever present. (Year 11 student)
>
> Competitions motivate you to prepare better for a judge who's going to criticise and compare your playing. (Year 12 student)

Figure 46: Do public performances that are non-competitive motivate you as compared to performing in competitions?

(Questionnaire 3-9)

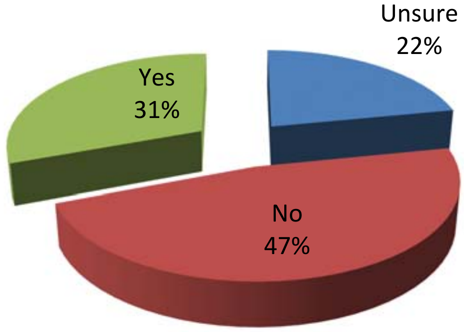
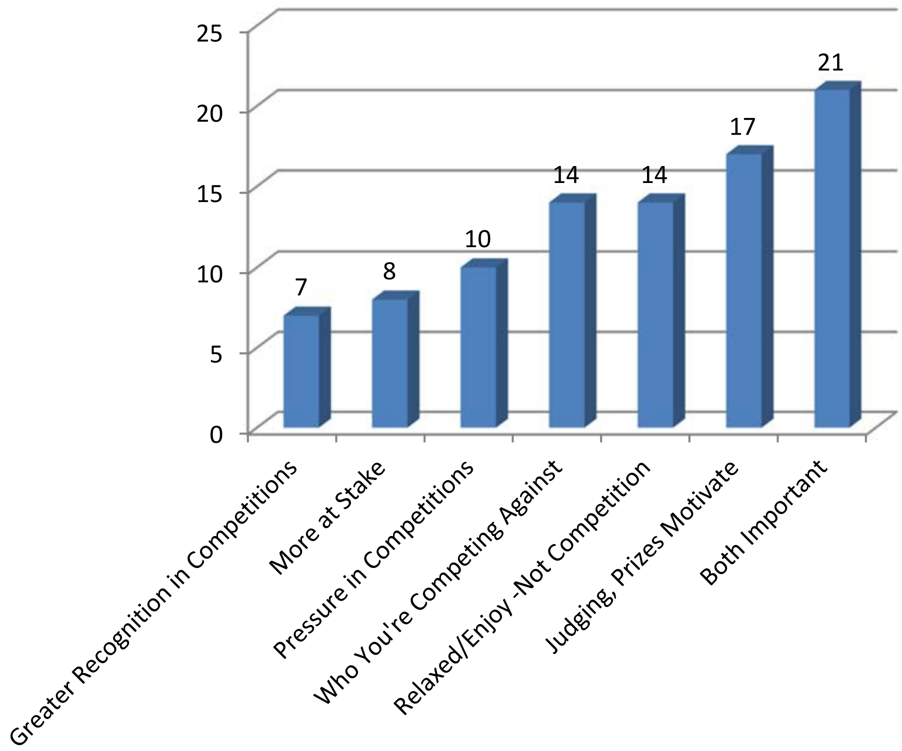


Figure 47: Themed comments- Do public performances that are non-competitive motivate you as compared to performing in competitions?

(Questionnaire 3-9) n=114 (students may nominate several indicators of which all are recorded)

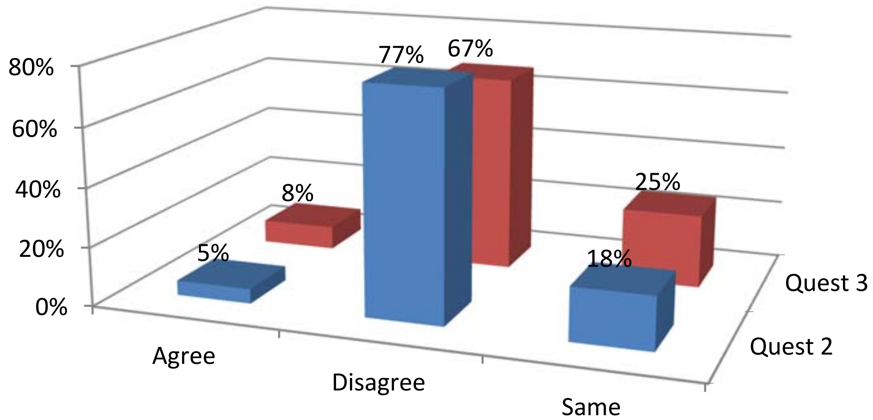


Ensemble Interest in Competitions – Conclusion of Ensemble Year

Students indicated a very high level of interest in participating in competitions during the post-competition and end of ensemble year questionnaires. The small 'Agree' response and large 'Disagree' response (77% and 67%) to a negatively phrased question supported the view that in this research group the majority of students were interested in participating in ensemble competitions.

Figure 48: What best describes your ensemble: not interested in competitions?

(Questionnaire 2-13a, 3-12a)

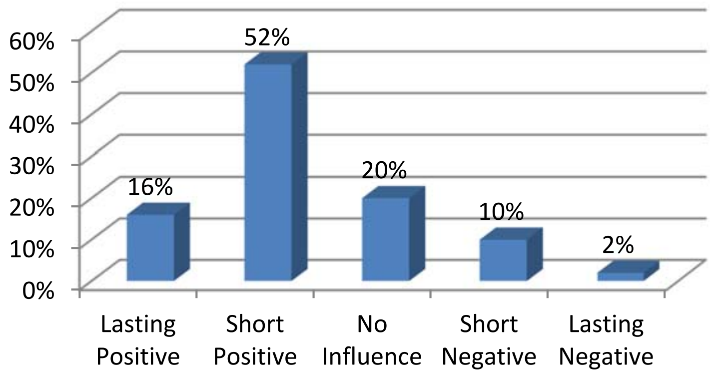


Influence of Adjudicator's Comments – Conclusion of Ensemble Year

The majority of students (68%) believed the adjudicator's comments had a positive effect upon their ensemble, with over 52% indicating that the effect was short term. This supports the view that critical feedback from competitions is regarded as important by students and that to maximise the influence of the feedback, ensemble directors should discuss the musical implications of these comments with the ensemble as soon as possible (Ponick, 2001).

Figure 49:   How would you explain the influence the adjudicator's comments had on your ensemble?

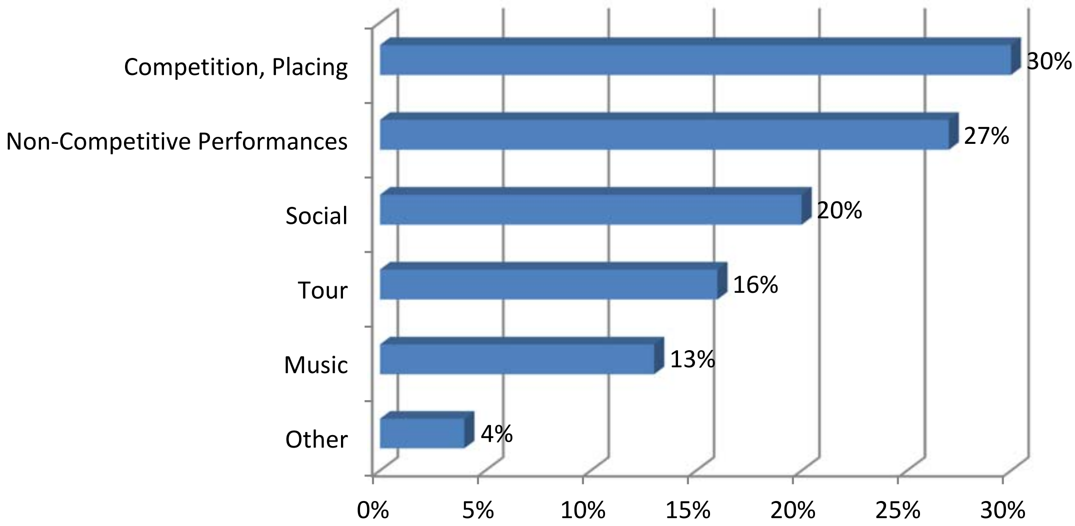
(Questionnaire 3-10)



Student Highlights from the Ensemble Year

Theming of student comments indicate that the 'competition placing' and 'non-competitive performances' feature prominently in what they regarded as highlights from their ensemble year. The 'social' aspect, memories of a 'tour' and 'music' they performed were also regularly mentioned. These responses are consistent with what students regarded as indicators for a successful ensemble year (see 2.4.2 and 2.4.3). The mention of a 'tour' from students is likely to also be linked to the 'social' aspect of ensemble life which had been identified by students to include 'friendship, fun and enjoyment'

Figure 50: List three highlights or best memories from performing in your ensemble (Questionnaire 3-15)



2.4.5 Motivation Trends through the Ensemble Year

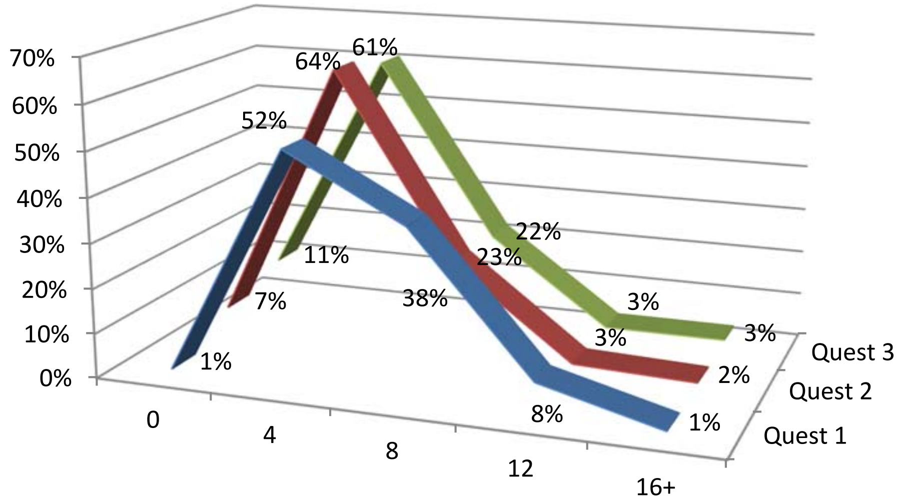
Inspiring students to continue to participate in voluntary, co-curricular music making activities requires considerable management and motivational skills by an ensemble director. The use of music ensemble competitions as an extrinsic motivational tool has been identified as one possible strategy by many music competition researchers (Herbert, 2011; Schmidt, 2005; Ponick, 2001; Austin, 1988).

The following data presents and compares three 'snapshot-views' of student perspectives regarding their ensemble music making experience for one ensemble year with particular focus upon exploring the influence that participating in a music ensemble had upon themselves and their ensemble. The data are discussed in terms of percentages although they represent the perspectives of 95 students who completed all three questionnaires associated with this research.

Hours of Personal Instrumental Practise Each Week

These data suggest that students spent more hours on personal instrumental practise in the lead up to their ensemble competition than they did following the competition performance. While 52% of students indicated that they did four hours of weekly practise in the first questionnaire prior to the competition; this figure increased to 64% in the second questionnaire following the competition. The decline is noticeable within the first questionnaire results from the 12 and 8 hours of weekly practise dropping from 8% to 3% in the second questionnaire. A noticeable increase occurs from the 0 to 4 hours practise in the first questionnaire 52 % and the second questionnaire 64%. There is only slight change between the second and third questionnaire with gradual increase across all three questionnaires in students indicating that they did no practise. These data suggest that, from the base line of the first questionnaire, approximately 20% of students were doing less personal instrumental practise compared to what they indicated prior to their ensemble competition.

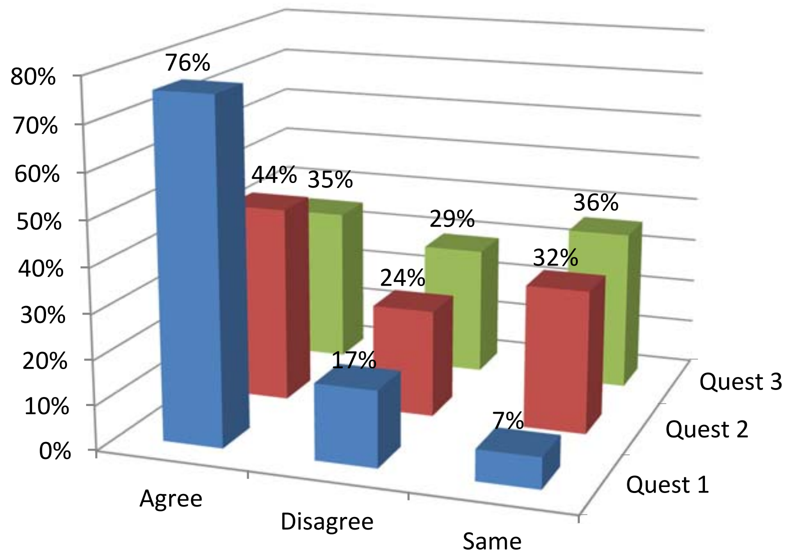
Figure 51: Indicate how many hours of practise you would do on your instrument each week. (Questionnaire 1-5, 2-12, 3-11)



Motivation to Practise Instrument More

Students indicated that there was a gradual decline in motivation to practise their instrument more throughout the ensemble year. The 'Disagree' column shows a 7% increase immediately following the ensemble competition and a further 5% toward the end of the ensemble year. Much of the reduction of the 'Agree' column has been transferred to the 'Same' column suggesting that their motivation to practise more remained the same as in the previous questionnaire.

Figure 52: Since the ensemble competition, I am motivated to: practise my instrument more. (Questionnaire 1-11a, 2-14a, 3-13a)

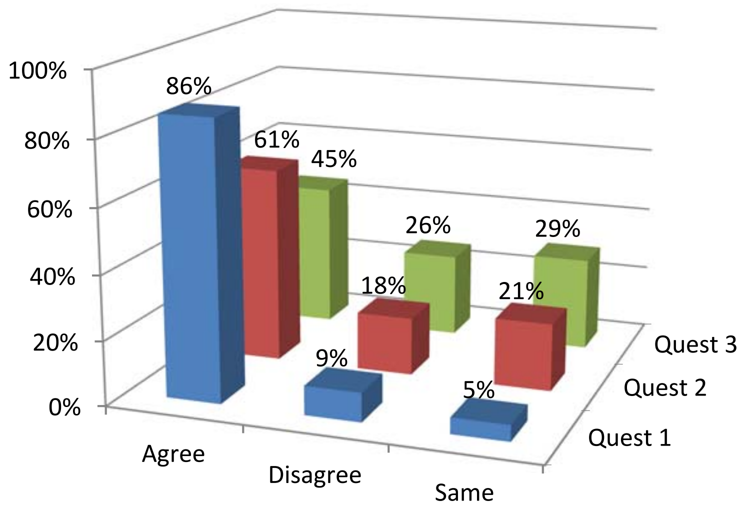


Rehearsal Attendance

There was a noticeable decline in student motivation to attend rehearsals immediately following competition that continued until the end of the ensemble year. The 9% increase in the 'Disagree' column for the post-competition questionnaire suggests that for some students, the passing of the competition resulted in them not being as motivated to attend rehearsals. This trend continued in the end of ensemble year questionnaire but it is difficult to determine if this could be considered annual attrition or somehow connected to a reduction in post-competition motivation.

Figure 53: Since the ensemble competition, I am motivated to: turn up for rehearsals.

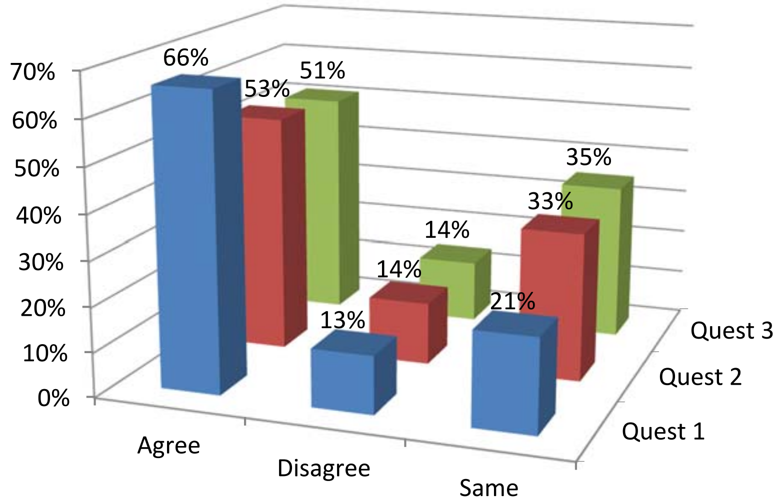
(Questionnaire 1-11d, 2-14d, 3-13d)



Treat Music Making More Seriously

Students in this research indicated little change in their motivation to treat music making more seriously prior to or following a competition. The decline in the 'Agree' column is accounted for by the increase in the 'Same' column suggesting that their motivation to treat music making more seriously remained the same as the previous questionnaire.

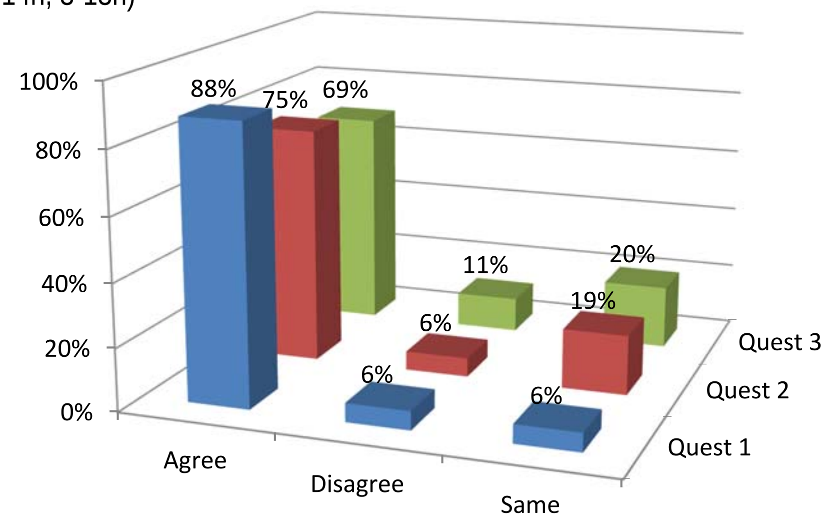
Figure 54: Since the ensemble competition, I am motivated to: treat music making more seriously. (Questionnaire 1-11f, 2-14f, 3-13f)



Improve Playing

Student motivation to improve their playing was consistently high and demonstrated little change throughout the ensemble year.

Figure 55: Since the ensemble competition, I am motivated to: try to improve my playing. (Questionnaire 1-11h, 2-14h, 3-13h)

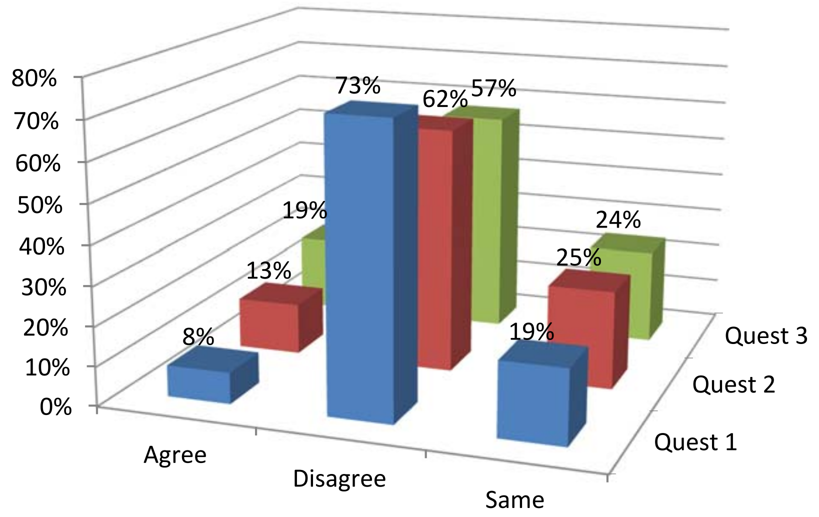


Emphasis Upon Winning

Although the vast majority of students disagreed that they were motivated to win at all costs, there was a noticeable increase in agreement (11%) to 'win at all costs' from the post competition and end of ensemble year questionnaire (see Figure 56, Agree column, 8%-19%). Reasons for this change are unclear and need to be considered in light of student responses to other questions.

Figure 56: Since the ensemble competition, I am motivated to: win at all costs.

(Questionnaire 1-11j, 2-14j, 3-13j)

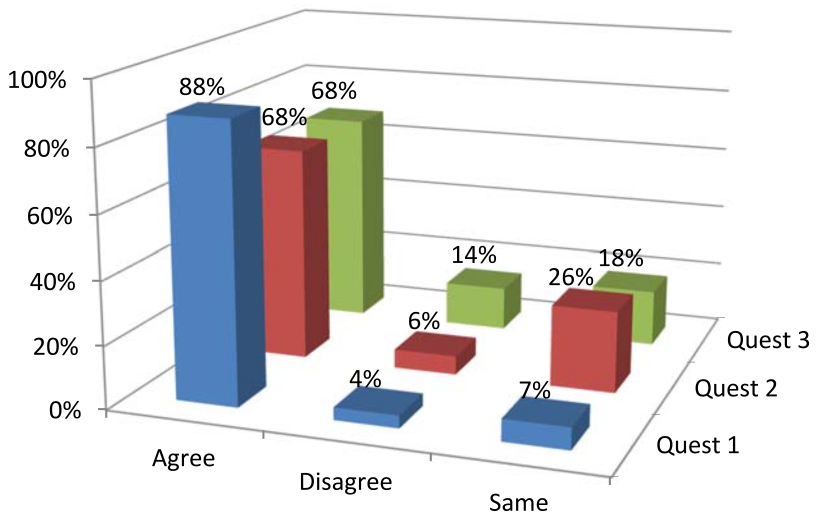


Wanting to be Part of a Team

There was considerable agreement that students 'wanted to be part of a team' and this research suggests student motivation for this does not change throughout the ensemble year. The decline in the 'Agree' column is accounted for by the increase in the 'Same' column and the slight increase in the 'Disagree' column suggests that by the end of the ensemble year, a small number of members may no longer be motivated 'to want to be part' of the ensemble.

Figure 57: Since the ensemble competition, I am motivated to: want to be part of a team.

(Questionnaire 1-11k, 2-14k, 3-13k)



2.4.6 Summary of Data Discussion

Students' Perspectives Regarding Ensemble Competitions:

In the students' views, ensemble competitions:

- Were seen as beneficial.
- Improved their individual and group motivation to rehearse.
- Enabled them to reach a higher level of group musicianship, because of the additional practice and focus associated with participating in a competition, than they would if they did not participate in a competition.
- Were regarded as more significant compared to non-competitive performances.

Benefits of Participating in Competitions

The students considered that participation in competitions:

- Builds student confidence and public performing experience.
- Gives a target or focus for musical improvement.
- Provides comparison and measurement against other groups.
- Provides motivation to try harder.
- Provides a reason for additional rehearsals.
- Strengthens social interaction within ensemble.
- Provides a social opportunity for interacting with other musicians.
- Promotes team building.
- Builds up excitement.
- Builds work ethic.
- Gives praise and recognition.
- Provides guidance with repertoire selection.
- Offers an alternative to non-competitive concerts.

Disadvantages of Participating in Competitions

The students reported the following disadvantages of competitions:

- Repertoire was limited during competition period.
- Increased practices interfered with other activities.
- Increased pressure was experienced.
- Others' effort and commitment were questioned.
- Over-competitiveness could arise.
- Disappointment of not winning had to be dealt with.

2.5 Conclusions and Recommendations

This research has examined the views and perspectives of high school students engaged in co-curricular music ensembles as they participated in a designed music learning experience that included participation in a music ensemble competition. To provide additional background regarding the students' perspective, the learning design intention of the ensemble director and the role that music ensemble competitions perform within the secondary school music curriculum was also examined.

The research was based upon a single pedagogical question: Will entering school bands and choirs into competitive music ensemble performances help them achieve better musical outcomes than if they only participated in non-competitive performances? The following key findings, conclusions and recommendations provide an answer to this question.

2.5.1 Key Findings

These results indicate that the students and teachers concerned viewed participation in ensemble competitions as beneficial for a range of reasons.

Students reported that ensemble competitions were highly valued and regarded as being 'fun and enjoyable'. Competition participation was seen as providing students with the motivation to increase their personal practise and attendance at rehearsals. A popular view amongst students was that their ensembles reached a higher level of musical proficiency because of the connection between a competition 'need' and the additional rehearsals and technical focus designed to address this 'need'. It was also pointed out that the ensemble was unlikely to have reached this level without the competition 'need'. Students noted that other benefits of competitions were the opportunity to compare themselves against other groups, as well as to receive praise and recognition for their efforts.

It was evident from the teachers' perspective that although ensemble competitions were not regarded as essential, they were regarded as particularly useful for encouraging student motivation to attend rehearsals and for focusing student learning upon improving performance and musicianship skills. Other benefits included a measurable goal structure, repertoire selection, performance opportunity, good workshop support, and social interaction with other ensembles. There was also acknowledgment that the school community (parents and administration) regarded competition as important and that this could be beneficial for gaining valuable support, enabling the provision of more time for additional rehearsals or performances.

The organisational structures of competitions were also mentioned as beneficial, with students and teachers valuing the opportunity to hear and see other bands, socialise with them, and in some instances have a guest conductor run a workshop with them.

There was a strong belief expressed by students and teachers that competitive and non-competitive performances were both important. It was also evident that students regarded competitive performances as more motivating, as well as more significant and memorable, than non-competitive performances.

Students recognised that the disadvantages of participating in ensemble competitions included social and personal pressures. The increased practices were regarded as impinging upon and creating conflicts with other committed activities, while the increased pressure for technical accuracy and personal practice resulted in some students questioning others' effort and commitment. Some students over competitiveness was also highlighted, while the only identified musical disadvantage was the limiting repetition of repertoire during the competition period.

The researcher suggests that student and teacher views regarding music ensemble competitions may 'tap' into social and cultural beliefs regarding the value and importance of competition generally. From the assembled evidence, music ensemble competitions appear to be currently used within the curriculum as an extrinsic motivator, supporting a short-term increased focus upon musical learning by creating a need to "do your best because you're being judged".

2.5.2 Recommendations from Findings

In light of the above findings, the following recommendations are offered as suggestions for maximising the learning potential of participation in music ensemble competitions. The term 'director' is used in an inclusive manner and refers to the conductor or teacher of a school based musical ensemble.

a) Directors consider designing a range of learning experiences for the ensemble.

This range could include: non-competitive performances, competitive performances, collaborative performances and rehearsals, performance tours, music learning camps, excursions to concerts, repertoire CD, guest conductors, student conductors, sectionals, small ensemble quartets and septets, peer tutoring, making connections with the broader community.

b) Directors consider participating in competitions that are more likely to ensure learning success than prize winning success.

Examples include: guest conductor workshops that include training and coaching, access to hearing other bands, opportunities to socialise with other bands, judging feedback, well organised schedule, a range of celebrated success that is not just measured by placings; winning may not be possible for all ensembles but succeeding through improved musical understanding and demonstrated performance should be.

c) Directors channel competition inspired motivation into learning experiences that enhance and deepen student musical understanding, knowledge and technical skills.

Directors should expect competitions to motivate, and plan to use this short-term focus to design longer term enthusiasm. Focus success upon achievable performance goals (such as accuracy, expression, and intonation) and building support mechanisms that may include such things as: extra rehearsals, sectional rehearsals, practice for personal bests, engendering support from and motivating the broader community, additional pre-competition performances, recording performances and celebrating post competition with a public performance that is used for recruitment and retention.

d) Directors articulate the competition adjudication process and criteria for their students.

It is recommended that directors explain to their students what the ensemble adjudicator is focussing upon and reinforce a process driven approach to addressing this criteria through ensemble accuracy and personal preparation.

e) Directors and ensemble jointly create identifiable performance specific indicators of success.

It is recommended that directors and students set indicators of success to match the criteria of competition judging in order to reduce the emphasis upon winning and more upon being a success on ‘your-own’ terms. This may include setting specific technique targets such as: playing a section without changing speed, shaping phrases as an ensemble, cutting off phrases as an ensemble, as well as blending tone.

f) Directors educate students about competition, cooperation and understanding success.

Encouraging a healthy attitude towards competition requires students to develop an understanding of the purpose and function of competition. Therefore, the director should: educate the ensemble regarding the nature of competition; the role of intra-group cooperation and inter-group competition; establish in what ways a music ensemble competition is similar or different to other competitions; recognise the adjudicators' dual role of assessing and ranking ensembles.

2.5.3 Limitations of Present Study

This research study is limited by a range of factors. These include: a specific focus upon a limited range of secondary school music ensemble students; only one form of data gathering (questionnaires); non-verified comments by students and teachers; and possible research bias in data collation and analysis.

The research design limited the scope of this study by not considering alternative viewpoints from non–competitive ensemble control groups. This decision was made by the researcher as this was regarded as not necessary for establishing students' perspectives on participating in music ensemble competitions. The research design also recognised that students were likely to participate in a range of ensembles within and outside of school that might or might not participate in ensemble competitions; therefore, student opinions and perspectives gathered by this research could also reflect other music ensemble experiences.

Another limitation may be possible researcher bias being introduced during the coding of student and teacher comments. Although care was taken to reduce this likelihood, additional consistency may have been achieved by a team of researchers discussing data. A decline in survey completion rates may have also reduced the breadth of student views.

This research study has focussed upon co-curricular music ensembles competing within ensemble competitions. Although many of the findings and recommendations are likely to be applicable to curriculum based classroom ensemble practice, the researcher recognises that fundamental differences in pedagogy, purpose and emphasis exist between curricular and co-curricular ensembles within Australian secondary schools.

2.5.4 Recommendations for Further Research

The key findings discussed in section 2.5.1 highlight a range of issues that further research studies into music ensemble competitions may wish to explore. This research recommends designing a study that deliberately compares the perspectives of students engaged within a competitive and a non-competitive music ensemble experience. This could address many of the issues raised within the key findings such as; to what extent competitive performances create a legitimising ‘need’ for additional practice and rehearsal time for students and the broader school community. It is also recommended that such research should also consider a more detailed study of individual students within competitive and non-competitive music ensemble groups, as this may provide further insight into what role competition plays regarding student motivation to practise their instrument and establish if there is a natural pattern of decline in hours of practice throughout the music ensemble year. Further to this, establishing the nature of what music is being practised by students and the balance of time devoted to solo (individual) or ensemble music may also provide further insight into the motivational influence of ensemble music competition with regard to student instrumental practice.

2.5.5 Conclusion: Answering the Research Question

The following research question was proposed at the start of this research:

"Will entering school bands and choirs into competitive music ensemble performances help them achieve better musical outcomes than if they only participated in non-competitive performances?"

Based upon the evidence presented within this study, and with reference to the discussion of this question section 2.1.2, it is the researcher's opinion that:

- Competition participation alone does not achieve better musical outcomes for school music ensembles.
- Competition participation does help ensembles achieve better musical outcomes if competition participation is connected to a process of sustained rehearsal and development that focuses upon developing and improving ensemble musicianship.
- Competitions are likely to produce a unique combination of motivational factors which legitimise the need for a greater emphasis upon musicianship and additional rehearsals.
- Competitive and non-competitive performances are both valued highly by students.

As to whether the same musical outcomes can be achieved without performing in competitions, this researcher suggests that the answer is yes. However, this is provided that a suitable motivational vehicle, such as a tour or a highly valued performance, is able to engender within the ensemble community an equivalent level of motivation, legitimising the need for a greater emphasis upon musicianship and additional rehearsals.

In conclusion, it is the researcher's view, based on responses of the teacher respondents, that the most important consideration for a school music ensemble director is how to design the ensemble music making experience so that better musical outcomes are more likely to be achieved because of the range and depth of musical learning activities in which students are involved. This research suggests that competitive music ensemble experiences do contribute to providing a short-term motivational benefit that can be used to direct learning energies into improving ensemble musicianship. Therefore, school music ensemble participation in competitions can help co-curricular ensembles achieve better musical outcomes, but only when combined with a range of learning strategies that could also be replicated through non-competitive performances. This research proposes that it is the process of learning, designed within a range of learning experiences, that determines if the ensemble has achieved better musical outcomes by the end of its ensemble year; not whether an ensemble has or has not participated in a competition and won or not.

Research Folio Topic 2

Teacher pedagogy within designed Music ICT Learning experiences: examining the pedagogy of secondary classroom music teachers with regard to an extended music remix classroom activity using Music ICT

3.1 Introduction

Designing music learning through the use of computer based Information and Communication Technology (ICT) has become an accepted and valued pedagogical strategy within secondary school music curriculums in the 21st Century. From humble beginnings in the 1980s, computer use within music education has evolved from initially being regarded as an awkward and difficult instructional support tool to being an integrated component, touching all music topics, and being an enabler of creativity.

Many music research studies have examined teacher and student use of computers during the past thirty years and noticeable changes in practice have occurred as a response to new technological advances as well as changes in teaching philosophy informed by cognitive, constructivist and social learning theories. How students learn and how teachers teach music using computer technologies is now of particular interest to educators concerned with engaging student learning through authentic musical experiences that enhance students' musical understanding, as well as their expressive musical expertise.

3.1.1 Need for this Research

Recent research studies examining music teaching and learning, and music technology have become extensive and robust (Colwell and Webster, 2011; McPherson, 2006; Colwell and Richardson, 2002; Colwell, 1992). Despite this increase in research depth and breadth, the researcher contends that detailed research examining music related ICT teaching pedagogy is unexpectedly limited.

Since 2000, music education literature has mirrored a plethora of general educational literature advocating the use of ICT to support greater student-centred learning and teaching strategies to transform, reinvigorate and ‘revolutionise’ secondary school music education with the world of 21st century students (Burnard and Finney, 2010; White, 2008; Ministerial Council on Education, 2005; Richmond, 2005). Despite many excellent models of exemplar teacher practice, “the research literature offers little support for the popular (though perhaps unrealistic) rhetoric about technology revolutionizing teaching and learning or teachers fundamentally reworking their lesson plans and pedagogy” (Hennessy et al., 2005 p.156).

A number of recent music research studies have recommended more substantial research into observed teaching strategies using music technology (Webster, 2012; Gall and Breeze, 2008; Burnard, 2007).

> The work in music education in studying the application of technology with constructivist (student-centred) approaches is strikingly meagre for a field that is so dominated by technology usage. We lack sophisticated studies that examine music learning primarily driven by music technology. (Webster, 2011 p.73)

The examination of teaching practice and teacher training has been researched from many perspectives, with one influential model being proposed by Lee Shulman (1987). His pedagogical reasoning model contends that teachers possess a unique body of pedagogical content knowledge that helps them design student learning so that specific concept constructions of knowledge and understanding become more likely. Shulman’s pedagogical framework has recently been applied to teacher training with ICT by Mishra and Koehler (2006) in their Technological Pedagogical Content Knowledge model (TPACK), with some encouraging success. Colwell (2011 p.125) suggests that there has been no “comparable” published research that has seriously examined music pedagogical content and curriculum knowledge. Shulman’s Pedagogical Reasoning Model and Pedagogical Content Knowledge may provide a fresh perspective for considering and examining music related ICT pedagogy (Music ICT).

This researcher proposes that further examination into the pedagogical considerations made by teachers when designing and delivering musical learning experiences using Music ICT is important for building a broader research knowledge base regarding: Music ICT Pedagogy; Music ICT Pedagogical Content Knowledge; and establishing to what extent student–centred strategies are reflected within teachers' pedagogy.

3.1.2 Research Approach

The focus of this research is to identify the pedagogical practices of secondary classroom music teachers as they design, deliver, and assess a Music ICT learning activity. A qualitative research methodology underpinned by a constructivist learning perspective and socio-cultural theoretical framework is used to examine the complexities and dynamics involved in a teacher's preparation and delivery of such a learning experience.

3.1.3 Summary of Research Design

Participants were ten secondary classroom music teachers, representing a range of teaching and Music ICT experience. They each prepared, delivered and assessed a common 'remix' type of Music ICT learning activity with one class. The activity was designed for a Year 7, 8, or 9 class and was intended to span 6-8 lessons. Participants could choose to design their own 'remix' learning activity or adapt existing resources to suit any computer platform or software. A researcher developed 'remix' learning activity titled, 'Music Creation Using Audacity', was provided to all participants.

The researcher gathered data through a mixed method qualitative design that included:

- The analysis of teacher designed resources; teaching and assessment plans, worksheets, and instructional resources
- The observation by the researcher of two lessons
- Three interviews; prior, during, and at the conclusion of the learning activity
- Three questionnaires; prior, during, and at the conclusion of the learning activity.

The data was analysed using a qualitative triangulation approach and interpreted using a dual 'analytical lens'. The first lens is a pedagogical reasoning model proposed by Shulman (1987) and extended by Webb (2002) and the second lens is a constructivist checklist proposed by Murphy (1997) and extended by the researcher.

3.1.4 Research Questions

The study addressed the following three research questions.

- What are the teachers' pedagogical considerations during this learning experience?
- Can specific examples of pedagogical content knowledge unique to Music ICT be identified?
- To what extent does the pedagogy reflect constructivist influenced teaching strategies?

These three questions were formulated following a preliminary literature review which identified the important role that teacher pedagogy plays towards supporting student construction of knowledge.

3.1.5 Definitions

The terminology used in this study is defined below.

Audio Remix refers to the creation of an alternative version of a song or instrumental piece of music that is different from the original version. These differences are created through an editing or remixing process that may include: reordering structural sections, addition or subtraction of musical elements, altering tones, texture, musical style, dynamics, pitch or tempo.

Constructivist Teaching Strategies refers to a range of ‘student-centred learning’ teaching approaches that have been influenced by constructivist learning theories. The terms, constructivist, constructionist and constructivism are used in an inclusive manner that does not differentiate between cognitive, social and radical forms of constructivism.

Internet refers to the global computer network that provides various information and communication facilities, consisting of interconnected networks that use standardized communication protocols.

Information and Communication Technology (ICT) includes the computer hardware and software, data projector, network connections, printer, internet access and communication software, such as word processing and email.

Instructional Resource is a learning aid that has been designed to address a particular learning focus using a structured learning sequence.

Pedagogy is the processes and methods a teacher employs when researching, designing, teaching, evaluating and reflecting upon a designed learning activity.

MCUA (Music Creation Using Audacity) is a researcher developed instructional resource that was used by six of the ten participants during this study.

MIDI (Music Instrument Digital Interface) is a standard protocol for the interchange of musical information between musical instrument, synthesizers and computers and was introduced in 1983.

Music ICT (Information Communication Technology) is a broad and inclusive combination of Music Technology and Information Communication Technologies that represent the tools used by students and teachers to research, listen, create, reflect and communicate their musical ideas.

Music ICT Pedagogy refers to the processes and methods teachers employ when they design and teach a music focussed learning activity that integrates music ICT.

Music Technology refers to the computer based hardware and MIDI-based instruments (Music Instrument Digital Interface) such as a piano keyboard, a range of music specific software programs (Audio and MIDI sequencers) as well as audio technologies such as microphones, sound mixers, amplifiers, headphones and audio speakers.

World Wide Web (www) refers to the internet-based computer system introduced in 1991 that allows computers to store and disseminate interactive documents in the form of web pages. These pages are accessed via a web-browser and may contain text, graphics, animations and video.

Web 2.0 refers to the evolving use of the internet and www for user-generated content and interactivity (such as Wikipedia, Facebook and Twitter) as well as Cloud Computing where program applications are accessed via web-browsers rather than installed on local computers.

3.2 Review of Literature

To position this research folio topic, the published literature and research findings regarding teacher pedagogy, Music ICT, pedagogical reasoning, constructivism, and deep and surface approaches to learning are examined.

3.2.1 Pedagogy

The following discussion regarding pedagogy and its historical basis is provided in order to position and clarify the research focus. This study refers to pedagogy as the processes and method a teacher employs when researching, designing, teaching, evaluating and reflecting upon designed learning activities. Current dictionary explanations for pedagogy include: "the study of the methods and activities of teaching" (Cambridge Advanced Learner's Dictionary, 2012) , "the profession, science or theory of teaching" (Oxford Advanced Learners Dictionary, 2010) and "the activities of educating or instructing or teaching; activities that impart knowledge or skill" (Webster's Online Dictionary, 2013). The etymological origins of the word 'pedagogy' come from the Greek 'paidagōgeō' which are derived from two words '*paidos*' meaning "child" and '*ágō*' meaning "lead" and literally means "to lead the child" (Online Etymology Dictionary, 2013).

Teaching methods and student organisation are regarded as two facets of pedagogy (Alexander, 1992). Watkins and Mortimore (1999) point out that our understanding of pedagogy has not remained static over time and that conceptions of pedagogy held by researchers and academics have become more complex over time as our understanding of cognition, metacognition and learning environments have developed. They described the existing late 20th Century approach to pedagogy as a complex model that "offers an increasingly integrated conceptualisation which specifies relations between its elements: the teacher, the classroom or other context, content, the view of learning and learning about learning" (Watkins and Mortimore, 1999 p.8).

How teachers organize their classes to a large extent reflects their beliefs about good teaching (Becker and Riel, 1999). Their pedagogical practices and even their philosophies themselves are subject to influence based on their continued experiences in teaching, the values and opinions expressed by their peers around them, and by the expectations of influential others which are transmitted to them through formal rules and procedures and informal norms (Glazer, 1999).

Music Pedagogy in Australian Secondary Schools

Australian secondary school music teachers are described by Carroll (1993) as usually music specialists who have had four years of tertiary level training and who are generally expected to design and implement school music programmes that cater for their particular school and student needs based on a State syllabi or curriculum frameworks. The way that music is taught and organised in Australian secondary schools reflects a number of philosophical and methodological influences that have emanated from Europe, the United Kingdom and the United States of America during the 20th Century (Pascoe et al., 2005). These influences have included: the Comprehensive Musicianship Programme (Choksy et al., 1986); Manhattanville Music Curriculum Program (Mark, 1996); Orff-Schulwerk in the lower secondary school; Creativity Movements including R. Murray Schafer, John Paynter, and George Self (Jeanneret et al., 2003); and more recently informal learning models such as Musical Futures (D'Amore, 2009; Green, 2008a). Each of these pedagogies emphasises to some degree student centred pedagogies, such as active learning, personal discovery and group learning.

In 2005, Dunbar-Hall described the pedagogical developments evident in secondary school music education, as compared to the early 1970s:

> We could note a move away from performance as the primary focus of music learning and teaching in schools to a model of music education that equalises the input of aural skills, creativity, musical understanding and performance in the hope of producing more rounded musicians; acceptance of popular music as a valid object of study; and the use of music from all times and places as the resource on which we base our work, rather than the almost exclusive use of historical styles of Western art music as was my experience as a secondary school student in the 1960s. Strategically, increased dependence on music as the primary source of information, rather than the use of secondary texts, is another observable change in music education, and one which implies ways that teachers will work and students can learn, noticeable among these, a move towards constructivist and student centred learning. In recent years, there has also been questioning of the cultural bases of the methods we use to teach music, and research into the diversity of processes students employ to learn music. (Dunbar-Hall, 2005 p.5)

Linked with these pedagogical changes has been a rapid, almost overwhelming, expansion of the use of technology in school music programs during the past twenty five years (Southcott and Crawford, 2011; Merrick, 2006). According to Cain (2004), technology has also shifted our music pedagogy approach. Classroom structures that had only a generation ago shifted from whole class to small group based work for composition and performance now require pupils to work in pairs or as individuals at a workstation with a set of headphones. This requires a very different pedagogical approach; one that also requires problem solving technician and maintenance skills.

Lesson Level Pedagogy - Expanded Events of Instruction

Identifying and understanding how pedagogy is represented and structured within individual school music lessons is of importance to this study. Instructional and cognitive psychologists have researched extensively the characteristics of what organisational strategies best facilitate learning (Smith and Ragan, 2005), and, although characteristics may vary according to the type of learning goals and orientation, the following episodes are regarded as common to most lessons;

- Introduction
- Body
- Conclusion
- Assessment (This may be delayed until a number of goals across several lessons can be assessed at the same time.)

(Smith and Ragan, 2005 p.129)

Gagne (1972) proposed that individual lessons generally include the following nine events of instruction.

1. Gaining attention
2. Informing the learner of the objective
3. Stimulating recall of prerequisite learning
4. Presenting stimulus materials
5. Providing learning guidance
6. Eliciting performance
7. Providing feedback
8. Assessing performance
9. Enhancing retention and transfer

Smith and Ragan (2005) suggest that these nine events can be represented as instructional approaches that support learning but which create different thinking or cognitive process demands on the learner. They describe lessons that provide a high level of organised support for leaners' cognitive processes (attention, encoding, and retrieval of information) as being 'supplantive'.

Lessons designed to provide much less instructional support and requiring learners to engage their own cognitive strategies to structure and organise information are described as being ‘generative’. They developed a model of Expanded Events of Instruction that presents a comparison between two possibilities for the source of learning control; supplied by the instruction (or instructional material) or generated by the learner (Table 7).

The Supplantive instructional approach is regarded as being more expository; setting forth the meaning or intent, while the Generative is more exploratory; guiding the search for meaning and intent.

Table 7: Expanded Events of Instruction

(Smith and Ragan, 2005 p.131)

Expanded Events of Instruction	
Generative ... student generates	Supplantive ... instruction supplies
Introduction	
Activate attention to activity	Gain attention to learning activity
Establish purpose	Inform learner of purpose
Arouse interest and motivation	Stimulate learner’s attention/motivation
Preview learning activity	Provide overview
Body	
Recall relevant prior knowledge	Stimulate recall of prior knowledge
Process information and examples	Present information and examples
Focus attention	Gain and direct attention
Employ learning strategies	Guide or prompt use of learning strategies
Practice	Provide for and guide practice
Evaluate feedback	Provide feedback
Conclusion	
Summarise and review	Provide summary and review
Transfer learning	Enhance transfer
Remotivate and cease	Provide remotivation and closure
Assessment	
Assess learning	Conduct assessment
Evaluate feedback	Provide feedback and remediation

Smith and Ragan suggest that both types of instruction could exist within a constructivist philosophy and that instruction at both ends of the generative or supplantive continuum could be learner–centred, active, and meaningful. This Expanded Events of Instruction offers an organisational structure and language from which to discuss individual lesson observation.

Scaffolding Theory

An influential instructional support theory that has had significant impact during the past 50 years is Scaffolding Theory. Scaffolding is described by Greenfield (1984) as the cognitive processing support that the instruction provides the learner, enabling them to learn more complex ideas that may otherwise be beyond their grasp if they were to depend solely on their own cognitive resources. Scaffolding Theory was first introduced by Jerome Bruner in the late 1950s to describe the assistance provided to young children with language acquisition (Fetner, 2011; Bruner, 1966). It paralleled the 1920s work of Russian psychologist Lev Vygotsky (1978) who is credited with detailing the interactional support and process by which adults mediate a child's attempts to take on new learning.

Degrees of scaffolding are described in terms of 'Low and High' and refers to the amount of supplied assistance to the learner for organising their learning processes (cognitive processing). Low scaffolding instructional strategies require learners to generate much of their own learning strategies and content where as high degrees of scaffolding supplies the learner with organised learning strategies and sequential learning content (Smith and Ragan, 2005 p.130).

Smith & Ragan (2005 p.141) suggest that much discussion has revolved around whether learning strategies should be "built" into the learner or into the learning materials. They identify that any instruction is designed to guide leaners' processing to some extent, so the decision for teachers is not a one or the other choice, but more a decision of where on the continuum of learner self-organisation and teacher facilitation of organisation should the instruction occur.

3.2.2 Music Information and Communication Technologies (Music ICT)

The term Music ICT is used in this study to refer to the broad and inclusive combination of Music Technology and Information and Communication Technologies (ICT) that represent the tools used by students and teachers to research, listen, create, reflect and communicate their musical ideas.

The term Music Technology has been used since the 1980s to refer to computer based hardware and MIDI-based instruments (Music Instrument Digital Interface), music specific software programs

(Audio and MIDI sequencers) as well as audio technologies such as microphones, sound mixers, amplifiers, headphones and audio speakers (Williams and Webster, 2006). A more inclusive 'brief history' of the development of music technologies extending back to the 1600s is provided by Webster (2002b p.39) who "places some of the landmarks in computer-based technology into historical perspective."

The term ICT has now evolved to mean the human process of using and applying technologies as well as the actual materials such as the hardware, software and network (Tolley, 2011). According to Haigh (2011), the phrase Information Technology (IT) was proposed in 1958 by Leavitt & Whistler and it was revived in US policy and economic circles during the 1970s to describe the convergence of the computing, media, and telecommunications industries. According to Tolley (2011), the term ICT evolved from a 1997 United Kingdom report by Stevenson (1997), which inserted Communication into the acronym 'IT', signifying the growing importance of IT as a communication tool.

I have chosen to use the term Music ICT rather than Music Technology in order to emphasise the importance of applying technology in a way that communicates and explores musical ideas acoustically and electronically.

ICT in Education

According to White (2008 p.2), the use of ICT in education is a relatively new phenomenon that has in a short space of three decades, brought considerable change to the capacity and globality of the way students and schools access, use and communicate using technology. White identifies the advent of the internet and World Wide Web as catalysts for this change. Although the purpose of using ICT in education is regarded by policy makers as providing improved student learning and economic and social advancement, research regarding this two-fold benefit is currently inconclusive due to a mismatch between the methods used to measure ICT effects and the type of learning that is promoted (World Bank, 2008). ICT has been identified as providing considerable learning support for building student knowledge and understanding within technology rich learning environments while at the same time transforming the teaching pedagogy and improving student learning outcomes (Johnson, 2012; UNESCO, 2012; Johnson and Adams, 2011; Apple Inc., 2008; Ministerial Council on Education, 2005; Bransford et al., 1999). It has also been recognised as economically significant to a global 'knowledge economy' with governments using ICT and education reform to advance social and economic development with the aim of producing future economic prosperity through a highly skilled and technologically literate workforce (Kozma, 2009; Finger and Russell, 2005).

Cartwright and Hammond (2007) suggest that despite the widespread claims of the benefits of using ICT in education, there has been very little impact on the focus of school teaching and learning with ICT being adapted towards teacher-centred pedagogies rather than student-centred pedagogies.

Prensky (2008) suggests that students within 'today's schools' are 'Digital Natives' fluent, conversant and accepting of technology and its uses and that they think and process information fundamentally differently from previous generations. For him and other analysts (Friedman, 2005), technology has changed and 'flattened' the world, requiring this generation of students and workers to have different skills from those promoted by the educational systems of the past.

Prensky identifies that the pedagogy required for teaching with technology is that the students should teach themselves with teacher's guidance. His views resonate with the thoughts of other educators (Price, 2013), that 'the new' pedagogy should be a combination of "student-centred learning", "problem-based learning", and "case- based learning", and that the teacher should be the "guide on the side" and not the "sage on the stage" telling, talking, or lecturing (Roblyer and Doering, 2010).

Prensky suggests that the reason the pedagogy of students teaching themselves never caught on as a mainstream approach is that the tools for learners were not good enough. In his view this situation has changed and he identifies today's technology of Web 2.0 software (McLoughlin and Lee, 2010), as providing learner centred tools suited to students, not teachers (Prensky, 2008 p.2). Windschitl (2002) believes that, although many of the challenges that face today's 'progressive' constructivist influenced teachers are similar to those that faced progressive educators of the past, the important differences are the expanding psychological and socio-cultural knowledge bases combined with the unique technological, economic and social contexts of education today.

Corporate hardware and software manufacturers such as Apple commenced research and promotion of teacher pedagogy that integrated technology within student learning activities during the mid-1980s (Baker et al., 1990). This corporate support for promoting models of ICT pedagogy continues into the 21st Century with the Google Certified Teacher program and the Apple Distinguished Educator programs.

ICT in Australian Schools

The Melbourne Declaration on Educational Goals for Young Australians (2008) identified that ICT is regarded as both a general capability embedded within all curriculum areas across all levels of schooling; as well as a learning area with a discrete body of knowledge (data, language procedures, electronic equipment) and skills positioned within the field of Technologies.

With progress towards an Australian Curriculum (ACARA, 2012) ICT is likely to continue to be integrated into all subject areas as well as be retained as a discrete learning area (ACCE, 2011). Music teachers will therefore be required to continue to integrate ICT into their curriculum and pedagogy.

Published research studies into the use of ICT in Australian schools are quite extensive and indicate that there is a significant use of ICT across the K-12 years of schooling. Examples of some of the research topics include: WEB 2.0 (Cochrane and Bateman, 2010; McLoughlin and Lee, 2010); Interactive White Boards (Murcia and Sheffield, 2010; Holmes, 2009); Gaming and Virtual Worlds (Wegener et al., 2012; Barwell et al., 2011); One to One laptop programs (Larkin and Finger, 2011); iPad and tablet computer trials (Kinash et al., 2012); and Learning Management Systems (Weaver et al., 2008).

Music ICT in Education

During the past three decades, there has been significant educational research examining both the creative processes that music technology can enhance (Webster, 2003; 1998) as well as the use of drill and practice repetitive software for the learning of theoretical concepts (Webster, 2003; Brown, 1999; Webster, 1998; Brown, 1995; Stevens, 1991). Other studies have emerged examining the processing of student ideas as they compose with computers and music technology (Folkestad, 2006; Seddon and O'Neill, 2003; Emmons, 1998; Erkunt, 1998; Younker, 1997). Early studies exploring gender and computers in the classroom identified a tendency for boys to be much more aggressive towards the use of technology (Comber et al., 1993). Recent studies suggest that in secondary education, the computer attitude of girls seems to be less positive than that of boys and that girls and boys tackle ICT tasks differently, taking on different tasks when working together (Volman et al., 2005).

Although technology has been an integral component of music education for many years (Webster, 2002a) ICT has been perceived as a relatively new and difficult classroom resource for educators to use, frequently creating a large degree of uncertainty and anxiety when using it with a class (Merrick, 2006). Merrick identifies this anxiety as being related to a lack of prior training and experience in the use of this equipment. Merrick suggests that, owing to this perception, its initial educational purpose was often simplified into the completion of small processing tasks such as music score transcriptions.

A number of music educators have highlighted the need for a new or revised learning philosophy to underpin the inclusion of technology in music teaching and learning (Mark and Madura, 2010; Cain, 2004; Swearingen, 2001). The rapid development of technology has also resulted in the need for classroom music teachers to regularly re-skill themselves in not only the use of devices and software but also the pedagogies that support student learning using the technology (Southcott and Crawford, 2011). Music researchers Dillon and Brown (2007) believe that Music ICT can both reveal and conceal possibilities and deficits in a student's creative musical skills and abilities by having observable products.

A number of music researchers have identified concerns that teachers have in using educational software to enhance student learning and understanding. These concerns include a perceived 'surface approach' to interacting with information and the difficulty of clarifying student understanding and assimilation towards knowledge using computer-based right or wrong paradigms. The drill and practice style software emphasises the testing or reinforcing of learning that happened elsewhere and multi-media presentations mostly emphasise lower cognitive processes such as knowledge and comprehension (Jennings and Tangney, 2001).

Music ICT in Australian Secondary Schools Music Curriculum

For Australian secondary school music students, the use of music notation software (such as Sibelius and Finale) as well as audio recording software (such as Logic, Garage Band, Acid Music, Cubase, Pro Tools) combined with MIDI keyboards and other sound sources have become commonplace in classroom learning (Merrick, 2006).

Southcott and Crawford (2011) suggest that music teachers are well aware that their students are frequently immersed in informal uses of music technology and that the use of it in school music programs can be attractive. Music teachers are often highly motivated to utilise the ever expanding range of available technology resources, however, the rapidity of change can leave teachers floundering (Southcott and Crawford, 2011).

A study by Crawford (2009a) explored the early development and use of music technology in Australian schools. The study identified that music technology in the form of non-computer-based Electronic Music was initially only represented within universities during the late 1960s and early 1970s. Crawford refers to a 1971 study by Chalmers on the state of electronic music in Australian schools which found that due to a lack of information and virtually no resources other than a record player, there were no systematized courses or established places within the existing secondary school music curriculums for electronic music. Crawford identifies that the way technology was perceived and used in Australian music education in secondary schools changed significantly with the evolution of the micro-computer and the arrival of the Music Instrument Digital Interface (MIDI) in 1983.

During the 1980s, two approaches to using music technology and computers became evident. In the United States this was Computer-Aided Instruction (CAI) and it took the form of highly structured classroom environments which simulated and guided instruction promoting intensive skill development. In the United Kingdom, Computer-Aided Learning (CAL) supported a curriculum promoting creativity and independent learning and was less skill-intensive and more suited to encouraging problem solving and general music classes (Crawford, 2009a).

Australian music educators like Stevens (1987) advocated using aspects from both CAI and CAL. He encouraged the use of highly-structured classroom settings in which teaching methods were expository and teacher-centred. This use of CAI was explored by Haldey (1996) who created an interactive lecture and tutorial resource on the topic of Russian music. Haldey described the pedagogical approach to using computers in music education during the mid-1990s as follows:

> Research shows that computers in the classroom are being used today mainly as a substitute for a teacher in the areas in which extensive drilling is required, or for testing student achievement. However, as computer technology becomes more sophisticated, the possibilities for more creative work with computers in music classrooms increase. In particular, technology is being used in the areas of sound experimentation, improvisation, composition, and presentation of new material in the form of interactive lectures or tutorials. (Haldey, 1996 p.23)

The need to improve the technical skills, confidence with technology and pedagogical techniques of teachers using computers was a common research recommendation throughout the 1980s and 1990s.

Research Studies in Music ICT Pedagogy

Published research examining Music ICT pedagogy began to emerge from the United States during the 1970s and by the 1980s had broadened to include secondary school teaching using MIDI equipped computers (Wiggins, 1992). Much of this research is described by Wiggins as lacking good research design with an undue emphasis being placed upon measuring student learning from teacher vs computer instruction research models. Webster (2002a) referred to research by Kim (1996) and Simms (1997) indicating that research into music technology pedagogy had broadened from computer aided instruction models to qualitative studies exploring student creativity and teacher pedagogy. Other researchers identified that initially music educators used the technology as a tool within their existing educational philosophy or pedagogical approach (Rudolph, 2004; Williams, 1992).

Cain (2004) suggests that technological developments have brought with them practical changes in the music curriculum as teachers have incorporated new possibilities presented by hardware and software developments. Composition pedagogy, originally developed for inaudible pencil and paper technology, can now draw upon audible creation and representation possibilities that include editable layers using authentic quality sounds and played-back with physically impossible speeds and accuracy (Paterson and Odam, 2000). The ability to research musical topics and view authentic film footage on the internet has resulted in teachers reconsidering a presentational approach towards analysis and historical listening in favour of promoting discerning research skills (Crow, 2001).

Technology has made possible a greater understanding of the relationship between music and visual images through activities such as creating soundtracks for imported movie files using various software. Students can now control the musical, artistic and technological decisions (Cain, 2004). Crawford (2009b) identifies that music teachers who employ authentic teaching and learning contexts within their Music ICT curriculums are more likely to engage student interest and lead to more effective learning.

Research into the use of music technology in Western Australian schools by Leong (1995) identified teacher views on the perceived benefits and uses of technology as well as the reasons why some teachers chose not to use technology within their music curriculum. Leong concluded that the benefits of using technology in music teaching were as follows: it provided students with self-guided individualised instruction, made teaching more efficient, and permitted interactive learning through hands on manipulation which was more aligned to the interactive nature of music. The obstacles he noted included: curricular constraints, budgetary support and teachers' expertise

Mills and Murray (2000) examined the use of ICT in music lessons in 52 secondary schools throughout England as part of an inspection study for the Office for Standards in Education (OFSTED). Following an observation of 161 lessons they concluded that 106 were 'good music teaching' lessons and from this group they suggest 7 characteristics of good or better music teaching using ICT.

Table 8: Seven Characteristics of Good or Better ICT Music Teaching

(Mills and Murray, 2000 p.132)

1	The teacher set a good example to pupils, encouraging them to take music, and the use of ICT in music, seriously.
2	The teacher was knowledgeable about the resources in use.
3	The teacher had thought about how the resources would be used to promote progress in music.
4	The teacher organised the resources so that pupils' time was used efficiently.
5	The teacher organised the lesson so that pupils' time was used effectively.
6	The teacher encouraged pupils to use their initiative, and to think about what they were doing.
7	The lesson was clearly a music lesson.

These seven characteristics provide an important insight into areas of Music ICT pedagogical practice that may provide important comparative discussion with the findings of this current research.

A UK study by Gall and Breeze (2008) examined the creative-collaborative process of upper primary students using the commercially available software Dance eJay. Their longitudinal study included an examination of teacher's considerations for learning design as well as observation of their pedagogy. They regarded the role of the teacher as key in establishing the positive learning environments that encouraged collaboration and 'risk-free' experimentation within a scaffolded learning structure (Davis et al., 2000). Gall and Breeze identified that the structure of the six observed lessons followed a similar pedagogical pattern and included: a 'launch' that included modelling/review and appraisal of previous work, 'practical' time for paired composition, and a final 'plenary' with review, appraisal and forward planning to the next lesson.

Teacher facilitated sharing and discussion during the 'launch' and 'plenary sessions' occurred at a whole-class level. Additional informal, discussions between student composition pairs, as well as with other nearby student pairs occurred frequently and were encouraged with the aim of increasing student collaboration. Another pedagogical point of interest was that teachers chose to break the ternary form composing project into manageable 'chunks' such as: one week for the introduction, the next for the A section etc.. The research findings identified by Gall and Breeze (2008) provide examples of Music ICT pedagogical practices that will be of interest to see if they are repeated within this current research study.

A different UK study by Ward (2009) explored student's musical creativity through the use of Music ICT within a secondary school setting. Ward employed a qualitative action research model that examined students' learning experiences within a classroom environment underpinned by Bruner's constructivist philosophy of going "beyond the information given" (Bruner, 1973). Ward's research findings support the view that enthusiastic, teacher-facilitated learning experiences, that are conducted in an informal class environment, coupled with learning activities that are multi-levelled with open-ended lesson content, motivate and enable students to strive towards "higher-levels" of creativity. These findings illuminate a range of pedagogical considerations that may provide worthy points of discussion and comparison for the current research study.

Ward identified that the learning design for this activity required considerable planning and resulted in direct and indirect student learning. Ward regarded his role as that of a facilitator; advising and coaching students, keeping the IT equipment working, as well as refocussing students towards producing a finished performance.

> The semi-supervised atmosphere of the classroom and my corporate role within it produced models that the pupils adopted with their peers, automatically sharing out roles to produce a result. This child-generated process engendered motivation to build on what was intrinsic to the pupil, promoting readiness for learning. (Ward, 2009 p.162)

Some pedagogical points of interest include the suggestion that introductory exercises or software skill development activities are important so as to enable students to familiarize themselves with the equipment before using it to be creative. Conjecturally, he suggests that exemplars or perfect outcomes should not be used to model learning outcomes, particularly if diversity of student outcomes is expected. Ward found that students applied visual information training more reliably than written text; citing the example that software specific process 'help-sheets' that he had prepared were rarely consulted whereas visual demonstrations were often requested. He believed pupils preferred to experiment until something happened that they liked.

Ward identified that unbidden peer-help from more computer and musically literate pupils was a common aspect of the classroom environment (Ward, 2009 p.160); building a culture of enquiry, sharing and support. Celebrating student achievement and participating in authentic musical and technological practice was possible through publishing on public domain websites such as YouTube.

Evaluation and ‘feedback’ was provided through class ‘performances’ that required students to play their work and then articulate the skills they had acquired and those that they needed for the future. Ward suggested that these student discussions and his own monitoring and evaluations enabled the setting of short-term objectives for each student. Of interest is Ward’s opinion that student’s metacognitive processes for describing their work were limited. Student’s discussions of excellent sounding musical pieces were frequently unable to detail their methods other than ‘it felt right’. This suggests that further consideration of reflection strategies within the teaching pedagogy may be required with Music ICT.

Other findings from Ward’s research study include technical support suggestions that teachers using Music ICT should: be well versed in all possible problems, because what can go wrong will go wrong; be understanding and patient with themselves as ‘first-hand’ problem solving experience is achieved over time; arrange to have access to knowledgeable, on-the-spot training and support; ensure computers and software are standardized and that network saving options have been checked.

The expectation that ICT be used in music education is stated in many Australian curriculum documents (DECS, 2004; Board of Studies NSW, 2003) however, a number of studies suggest it is not embedded enough into the regular pedagogy of the learning experience (Merrick, 2006; Merrick, 1999). Other researchers identify that much worthwhile learning in music takes place without the use of ICT and that a range of learning experiences including Music ICT is preferable (Mills and Murray, 2000). For music programs that do not embed ICT learning, a Music ICT lesson is frequently regarded as going to a computer laboratory in which the production of music using computers is normally associated with solitary and virtual experiences (Dillon and Brown, 2007). Recent studies by Crawford (2009b) suggest that music technology is often poorly resourced in many secondary schools in Australia. Her case study of a Victorian government secondary school found that Arts subjects such as music were frequently denied access to ICT due to school prioritisation of scarce resources and that it was only the teacher’s initiative and imagination that turned minimal Music ICT resources into effective music education.

Music ICT as authentic musical practice

The term authentic learning can have a variety of meanings but there is general agreement among educators that it should provide real world relevance and personal meaning to the learners (Kearney and Schuck, 2008).

For music educators, authentic learning and authentic musical practice is embedded within many practical learning activities such as performing, composing, arranging, and responding (ACARA, 2012). Contemporary music making and contemporary music education are frequently linked to the use of technology (Pascoe et al., 2005) and it is believed that engaging students in curriculum that reflects contemporary music practice, through the use of authentic Music ICT tools, not only engages student interest but also raises the status of music in the school curriculum through demonstrated relevancy (Crawford, 2009b). Popular music styles such as rock and DJ remix styles have frequently been regarded as authentic musical vehicles for student engagement and learning within a secondary school curriculum (Neff, 2011; Snell, 2011; Challis, 2009; Green, 2008a; Green, 2002).

The Remix as Authentic Musical Practice

The process of rearranging music through structures of themes and variations have been occurring for centuries; Mozart's 12 variations on 'Ah vous dirai-je, Maman' (KV265), otherwise known as the Twinkle Twinkle Little Star variations is but one example. The emergence of convenient technologies such as recording media and magnetic tape during the mid-20th Century saw the development of new musical re-arranging approaches such as musique concrete (Pierre Schaeffer, Edgar Varese) in which the manipulation of existing recordings to unrecognisable extremes created new music and soundscapes.

According to Langford (2009), it was not until the late 1960s and early 1970s that the contemporary popular music activity of 'remix', as we know it, began. Langford identified a number of important DJ musicians and the contribution they made to this musical genre. These include: the important 'dub' remix techniques of Jamaican producers such as King Tubby and Lee 'Scratch' Perry; Tom Moulton who invented the 'breakdown' and the 12 inch single remix disco record of the 1970s; and Shep Pettibone, whose remixes during the 1980s established 'house' music as part of the mainstream dance culture. Langford also recognised the important role affordable technological advances played in making remix tools possible for home musicians without access to a recording studio. The audio samplers and synthesizers of the 1980s, combined with the home computers and audio software of the 1990s, became the tools that made possible the 'mashup' remix style of the 2000s and the emergence of the 'superstar remixer DJ' such as Fatboy Slim and David Guetta.

3.2.3 Pedagogical Reasoning

Shulman's Pedagogical Reasoning Model

Shulman's published research and writings identified the importance of teacher knowledge in relation to classroom practice. Shulman's (1987) Pedagogical Reasoning Model provides a taxonomy of knowledge bases that classifies the types of comprehension required of teachers for promoting effective student learning. The research underpinning this taxonomy was a series of longitudinal studies in which Shulman followed the knowledge growth of novice teachers in a similar way to Piaget's observation and mapping of the growth of young novice learners. Shulman then compared these to the observed practices of experienced teachers.

> As we have come to view teaching, it begins with an act of reason, continues with a process of reasoning, culminates in performances of imparting, eliciting, involving, or enticing, and is then thought about some more until the process can begin again.
> (Shulman, 1987 p.12)

This cycle of comprehension, reasoning, transformation and reflection is the basis of Shulman's Pedagogical Reasoning model. Shulman suggests that for teachers to teach effectively it is essential that they have knowledge of all the following areas:

Shulman's Model of Pedagogical Reasoning

- Content knowledge.
- General pedagogical knowledge; with special reference to those broad principles and strategies of classroom management and organization that appear to transcend subject matter (knowledge related to general teaching issues, e.g., teaching approaches, classroom management).
- Curriculum knowledge, with particular grasp of the materials and programs that serve as "tools of the trade" for teachers (knowledge about the "tools of the trade": schemes of work, resources, etc.).
- Pedagogical content knowledge, that special amalgam of content and pedagogy that is uniquely the province of teachers, their own special form of professional understanding.
- Knowledge of learners and their characteristics.
- Knowledge of educational contexts, ranging from the workings of the group or classroom, the governance and financing of school districts to the character of communities and cultures (groups, classes, school and wider community).
- Knowledge of educational ends, purposes, and values and their philosophical and historical grounds.

(Shulman, 1987 p.8)

Of this list, Shulman's concept of Pedagogical Content Knowledge has proved most pertinent to the broader educational debate (Gall and Breeze, 2007). Shulman explains Pedagogical Content Knowledge as:

> …the blending of content and pedagogy into an understanding of how particular topics, problems, or issues are organized, represented, and adapted to the diverse interests and abilities of learners, and presented for instruction. .. (It) is the category most likely to distinguish the understanding of the content specialist from that of the pedagogue. (p.8)

This construct of pedagogical content knowledge challenges the assumption that a good teacher is able to teach anything and that knowledge of subject matter alone is sufficient preparation for effective teaching (Shimon and Brawdy, 2001). For music education, this suggests that the music teacher requires particular and unique knowledge bases for mentoring individual and student groups through the range of music learning activities such as: instrumental performance, ensemble groups, music composition, improvisation, historical and critical analysis, as well as a range of Music ICT knowledge bases specific to each of these activities.

Webb's Extended Pedagogical Reasoning Model

Webb (2002) developed an expanded model of Shulman's Pedagogical Reasoning model to offer a framework for analysing and developing pedagogy for implementing the United Kingdom ICT curriculum. This expanded model incorporated the additional consideration of teachers' ideas, beliefs and values that had been found to influence teacher practice (Moseley et al., 1999; Fang, 1996), as well as affordances, which is an object's or environment's perceivable uses or application (Gibson, 1977). Examples of Music ICT affordance could be, a MIDI keyboard being perceived as most useful for piano playing, or loop-based music software (such as Garage Band, ACID Music) being perceived as most suitable for creating music that features repetition through riffs, grooves or ostinatos. Webb and Cox explain this further:

> In examining pedagogy with respect to the use of ICT in education we need to consider the affordances of the whole learning environment, which include the teacher and the other students. At the representation stage in the pedagogical reasoning process teachers need to decide what resources and approaches are likely to enable students to develop the particular skills and concepts on which they are focusing. They also need to be able to identify affordances in any suitable software and other resources for exploring and developing the ideas and skills that

> are to be taught. They then need to build these into lesson plans that involve activities in which they and the students also have roles in providing affordances. (Webb and Cox, 2004 p.23)

Webb developed a detailed flow chart model (Appendix 8 & Appendix 9) to represent the pedagogical reasoning that she considered teachers undertake when planning, preparing, instructing, assessing learning and reflecting upon their instruction. This flow chart will be referred to later within the research and analysis design sections of this folio.

Research Using Pedagogical Content Knowledge

Since proposing the idea that pedagogical content knowledge is a special domain of teacher education, Shulman has been cited in over 1,200 refereed journal articles (Ball et al., 2008). Shulman's ideas have been investigated by Ball and her colleagues who examined pedagogical knowledge through a study of teaching episodes and concluded that specialized pedagogical content knowledge exists and that it is not typically needed for purposes other than teaching (Ball et al., 2008). This knowledge included identification of misconceptions and the role of prior knowledge in students, understanding that something is so and why is it so, and recognizing erroneous problem-solving strategies. Several of Ball's doctoral students also suggest that as knowledge is culturally specific, so teaching knowledge is also culturally specific (p.404). Ball suggests that effective teachers need to anticipate what students are likely to do and think during the learning process, sequence particular content to make student understanding more likely, as well as connect particular content with the act of teaching. Ball identifies that discipline specific pedagogical content knowledge can be represented like a list of habits of mind, consisting of skills, sensibilities, and judgments as well as knowledge. Her research suggests that deep subject specific knowledge (mathematics and sciences) by itself is an inadequate preparation for teaching or for curriculum construction and that specialists require deeper understanding of learning, sequencing knowledge and skills in order to assist students construct their own understanding.

Colwell (2011 p.125) indicates that there has been no "comparable" published research that has seriously examined music pedagogical content and curriculum knowledge. Colwell suggests that as in the mathematics and sciences, a similar situation exists in school music education where musicians with deep subject specific knowledge such as percussion majors, piano majors or composition majors, will approach teaching general music courses very differently from each other and that for effective school based teachers, a deeper understanding of sequencing for constructing learning is required. Colwell proposes that research in music pedagogical knowledge should focus upon "what knowledge in music is unique to (the) teaching (of music) and whether our sequencing of instruction allows us to anticipate misunderstanding of important concepts" (p.125). He also questions how instruction is delivered and will this analysis of specific teaching episodes make identification easier or more difficult. Colwell continues by suggesting that "research should also include what students (trainee music teachers) need to know and be able to do in order to teach effectively. Clear indicators of a student's prior knowledge and misconception about music would be needed, along with the context that makes music so important in one's life." (p.125)

The applicability of Shulman's pedagogical reasoning model to music teacher education is also identified by music educator Janet Barrett (2002). She suggests that there are two complementary theoretical realms in which music teachers must build their skills and understanding. The 'first order' subject matter focus addresses the musical understanding of students through the process of musical engagement (singing, composing, improvising, describing, representing, evaluating and responding), as well as a 'second order' focus that addresses the pedagogical understanding that music teachers use to enable students' musical growth. The application of this pedagogical knowledge is evidenced within their instructional techniques, representative models, works, examples, and metaphors as well as the curriculum planning, lesson sequencing and assessment strategies that they employ.

Further development of Shulman's pedagogical framework has extended into the examination of teacher training and technology. Mishra and Koehler (2006) presented a Technological Pedagogical Content Knowledge (TPACK) model designed to examine the understanding of teacher knowledge required for effective technology integration within primary and secondary school curriculums. The model presented three intersecting domains: Pedagogical Knowledge; Technological Knowledge; and Content Knowledge, and it is the intersection of the three domains that indicates the level of TPACK integration. Their research approach included self-assessed questionnaire based data gathering and statistical analysis. This framework was extended by Schmidt et al. (2009) and used as an examination tool for describing and understanding the goals of technology use in pre-service teacher education. Jordan (2011) also applied self-assessed TPACK surveys to a study of beginning teacher integration of technology within Victoria, Australia. This study found that beginning teachers have high levels of confidence to integrate ICT into their practice, while female beginning teachers were more confident with their Pedagogical Knowledge domain whereas male beginning teachers were more confident in relation to Technological Pedagogical Knowledge. This finding seems particularly interesting as gender based teacher domain pedagogical knowledge may be observable in this folio study.

The ‘knowledge bases’ contained within Shulman’s Model of Pedagogical Reasoning have been used in Music ICT related research project. A study by Gall and Breeze (2007) used the ‘knowledge bases’ as a lens to categorise and discuss teachers’ perceptions, personal philosophies and pedagogical styles within a study of the sub-culture of music and ICT in UK classrooms. Their analytical approach suggests that Schulman’s idea of ‘knowledge bases’ is a suitable lens framework to base further research studies involving Music ICT pedagogy.

The Shulman pedagogical model has been criticised for being drawn from a theory of cognition that views knowledge as fixed and external and on a teacher-centred pedagogy that does not incorporate the thinking process of the students (Banks et al., 1999). The conception of subject matter has also been regarded as a relic of the structure-of-the-disciplines thinking that underpinned the US curriculum reform movement of the post Sputnik 1960s era and whereas Dewey, and Bruner hoped to change society through school curriculum reform, Schulman places an emphasis upon educational change through teacher subject matter knowledge which is institutionally and socially determined (Deng, 2007 p.292). Hattie (2009 p.113, p.248) also suggests that despite the plausibility of the claim that teachers need to know their subject matter to teach it, he claims that there is currently no large body of research evidence to support the notion of improved student outcomes due to teacher subject matter knowledge and pedagogical knowledge.

Indicators of Pedagogical Content Knowledge

The following list of general pedagogical content knowledge indicators was developed by the researcher based upon the writings of Shulman (1987), Ball (2008), Colwell (2011), and Barrett (2002). A contextualised discussion of these indicators is explained with reference to the Music ICT Remix Learning Experience in portfolio section 3.5.5 (p.192).

Pedagogical Content Knowledge Indicators

- Definition of culturally agreed understandings of concepts.
- Arrangement of learning experiences through structured guidance.
- The sequencing of skills and content to make understanding more likely.
- Anticipation of likely student learning behaviour.
- Identifying prior student knowledge and understandings.
- Identifying indicators of misconceptions or likely misunderstandings.
- Assessing learning and understanding: creation of criteria or performance standards - formative and summative strategies.

3.2.4 Constructivism and Pedagogical Research

The origins and significance of constructivist learning theories and their influence as theoretical bases for student-centred learning pedagogies have been outlined and discussed within the folio introduction. Of interest to this research study are the findings from recent research studies examining pedagogical applications of constructivism.

Becker and Riel (1999) examined the constructivist-compatible pedagogies of 4000 teachers across 1100 United States schools and found that teachers who had a collaborative role orientation rather than a solely classroom focus were more likely to engage in teaching practices consistent with constructivist teaching practices. Of further interest was the suggestion that teachers engaged in collaborative professional activities and in constructing new understandings among their colleagues were more likely to encourage their students to collaborate and take an active role in knowledge construction. In a different study, Ravitz & Becker (2000) suggested that computer use amongst teachers was leading to changes in practice that were of a more constructivist-compatible direction.

In a further study integrating technology and constructivist pedagogies, Judson (2006) explored the relationship between teachers' beliefs about learning and what is exhibited in their practice. In this study, 32 classroom teachers completed a survey measuring their beliefs about instruction and they were later directly observed and rated by the degree to which technology integrated lessons were aligned with constructivist principles. Judson's findings did not reveal any significant relationship between practices and beliefs and although most teachers identified strongly with constructivist convictions these ideas were not exhibited in their practices. The integration of technology into the classroom was also not regarded as an indication of constructivist pedagogies. "Technology is not a mechanism that enables constructivism, it is a device best used at the moment when it enables students to gain deeper understanding. Technology as tools – this is the implication." (Judson, 2006 p.592).

Research studies examining constructivist Music pedagogies have begun to emerge from North America. Carroll (2007) adopted a social constructivist approach to teaching the language of music and then explored the social interactions of children aged 5-9 as they created notational systems to represent songs they had learnt. The qualitative study used a social constructivist perspective with organising elements such as: context, voice, relationship, emergent theme and aesthetic whole. Carroll's results indicated that interaction with classmates was especially important and that children refined their notation, when required to sing using the notation and when teaching it to others.

Loren (2003) examined collaborative construction of learning and its effect on motivation within a fifth-grade general music class presented with a project-based learning activity. This action research project had a social constructivist theoretical base and data sources included: transcribed video recording, field notes, teacher reflection journal, student interviews and surveys. The study documented the successes of collaboration, difficulties with some student behaviour, poor organisation and intervention strategies. Loren found that students enjoyed the opportunity to direct their own learning but that this did not necessarily result in intrinsically motivated learners. Teacher intervention was required to remind students that in pursuing their own interests they still had to meet learning expectations.

Wiggins (2000) examined how six students from third grade composed or improvised with their peers. Using a qualitative social constructivist conceptual base, she analysed video data to explore the notion of shared musical understanding, independent music thinking and how an individual constructs knowledge with the help of others. The findings indicated that shared understanding was reflected through the musical elements within students' compositions and improvisations. Wiggins regarded group work as outweighing the importance on any one individual and that the ensuing verbal interaction based upon the musical activity seemed to promote independent musical thinking from members within the group. The findings also emphasised the importance of shared understanding in the musical thought processes of students. In Wiggins view, this is the primary basis for musical problem solving and for the development of musical understanding.

Dunbar-Hall (2005) identified that one of the noticeable differences between the secondary school music education in Australia during the 1970s and that of the 21st Century has been a move towards constructivist and student centred learning.

3.2.5 Constructivist Teaching Checklist

Creating constructivist learning environments from the broad range of constructivist philosophies, psychology and epistemology has presented an ongoing challenge to reform minded educators since the late 1980s (Fosnot and Perry, 2005). One influential educator who tackled this issue was Elizabeth Murphy. In 1997, she published a website exploring constructivism in which she examined how this theory of learning was being translated into teaching practice. Of particular interest is a Constructivist Checklist (Murphy, 1997) that has since been applied to, or modified to suit, a range of other published research studies (Koohang et al., 2009; Korcova, 2007; Steffen, 2006; Ferguson, 2005).

Murphy acknowledged that she drew upon the work of the following authors to create this checklist:

- Design principles identified by Jonassen (1994; 1991).
- Cognitive teaching models which emphasise constructivist concepts by Wilson and Cole (1991).
- Radical and social perspectives proposed by Ernest (1995).
- Honebein's (1996) seven goals of design for constructivist learning environments.
- Scaffolding principles derived from Vygotsky's (1978) zone of proximal development theory.

Eighteen points were identified and these are listed in Table 9. Murphy describes the checklist in the following way.

> (The) checklist is designed to serve as a simple instrument to observe some of the ways in which these constructivist characteristics are present in learning projects, activities and environments. The observation should provide insights into the ways in which constructivist philosophy translates into practice. (Murphy, 1997 p.13)

Table 9: Characteristics of Constructivist Learning and Teaching

(Murphy, 1997)

1.	Multiple perspectives and representations of concepts and content are presented and encouraged.
2.	Goals and objectives are derived by the student or in negotiation with the teacher or system.
3.	Teachers serve in the role of guides, monitors, coaches, tutors and facilitators.
4.	Activities, opportunities, tools and environments are provided to encourage metacognition, self-analysis, self-regulation, self-reflection and self-awareness.
5.	The student plays a central role in mediating and controlling learning.
6.	Learning situations, environments, skills, content and tasks are relevant, realistic, authentic, and represent the natural complexities of the 'real world'.
7.	Primary sources of data are used in order to ensure authenticity and real-world complexity.
8.	Knowledge construction and not reproduction is emphasized.
9.	This construction takes place in individual contexts and through social negotiation, collaboration and experience.
10.	The learner's previous knowledge constructions, beliefs and attitudes are considered in the knowledge construction process.
11.	Problem-solving, higher-order thinking skills and deep understanding are emphasized.
12.	Errors provide the opportunity for insight into students' previous knowledge constructions.
13.	Exploration is a favoured approach in order to encourage students to seek knowledge independently and to manage the pursuit of their goals.
14.	Learners are provided with the opportunity for apprenticeship learning in which there is an increasing complexity of tasks, skills and knowledge acquisition.
15.	Knowledge complexity is reflected in an emphasis on conceptual interrelatedness and interdisciplinary learning.
16.	Collaborative and cooperative learning are favoured in order to expose the learner to alternative viewpoints.
17.	Scaffolding is facilitated to help students perform just beyond the limits of their ability.
18.	Assessment is authentic and interwoven with teaching.

Murphy applied this Constructivist Checklist to four computer-based projects and environments which were described by their creators as constructivist. Her intention was to determine if and in what ways the projects accommodated or supported constructivist characteristics and principles of learning. Murphy identified that the checklist was not sufficiently sophisticated to allow for descriptions of the degrees to which each of the characteristics were supported and her analysis was limited to identifying if the characteristic was represented and by what means this was represented. Her findings indicated that certain projects emphasized particular characteristics over others. Problem solving, student-directed learning and apprenticeship learning were favoured approaches. How scaffolding, metacognition and multiple perspectives were represented varied considerably from project to project. Characteristics such as: 'learner control' and student-directed goals'; were both linked with the 'teachers as coaches' approach.

Deepening the Checklist

This checklist was originally designed to examine published written evidence and Murphy was prudent to suggest that it was not sophisticated enough to measure the degrees to which these characteristics were represented. The researcher suggests that a broader range of gathered evidence may provide the necessary evidence to enable a speculative measurement of the degrees to which these characteristics are evident; something that was not possible in Murphy's original document based research.

3.2.6 Pedagogical Constructivist Depth Checklist

The following discussion outlines additional theories and research evidence that support a research strategy for extending Murphy's Constructivist Checklist to include a speculative measurement of learning design depth.

Surface and Deep Approaches to Learning and Teaching

An important component of constructivist influenced pedagogies is the reference to a quality or measure of learning or understanding. The common representational terms used are "surface" and "deep" and they are used in reference to; knowledge and understanding, student approaches to learning, and teachers' approach to pedagogy.

Research distinguishing between deep and surface approaches to learning is derived from the seminal work of Marton and Saljo (1976). Their research into student approaches to reading and comprehension identified that students approached learning tasks differently, resulting in processes of learning which lead to qualitatively different learning outcomes. Biggs (1987) and Marton (1983) describe the general framework and defining features of deep and surface approaches to include the following.

The ‘deep approach’ is associated with intrinsic motivation and a general interest in the learning activity, a focus towards understanding the meaning of the learning, relating new ideas to previous knowledge and connecting everyday experiences with concepts. The learner has a desire to personalise the task and make it meaningful to their own experience. Dart et al. (2000) describe “deep learning” as an approach characterized by the learner intentionally seeking meaning from the material being studied. This suggests that learners actively construct knowledge for themselves by using the learning material to elaborate and transform their understanding.

The ‘surface approach’ is based upon extrinsic motivation perceiving the learning activity as a demand to be met, requiring memorisation of discrete facts, reproducing terms and procedures through rote learning, and viewing the learning task as isolated activities with little connection to their own life experiences. Dart et al. (2000) also suggest that in a surface approach the learning material is often reproduced and is related to a traditional transmission model of teaching in which information is transferred from teachers to learners and the learner assumes a passive, receptive role.

The term ‘approaches to learning’ refers to the ways in which students go about their academic tasks and this in turn affects the nature of the learning outcome (Biggs, 1994). Conflicting viewpoints exist as to whether students have a predilection to adopt deep or surface approaches to learning as part of a style-like stable trait or learning orientation (Schmeck, 1988; Entwistle, 1981) or whether the particular context and response to the learning situation are factors in student approaches to learning (Ramsden, 1988; Marton, 1983). Biggs (1987) suggests that the extent to which students change their approach to learning according to the situation is affected by the student’s predisposition to change and personal characteristics such as ability. For effective learning and teaching, students require both the will (motivation) and the skills to learn (Pintrich and Schunk, 2002). Therefore creating classroom learning environments that facilitate deep approaches to learning must ensure that students possess a range of prerequisite learning strategies that take full advantage of the teaching and learning experiences (Dart et al., 2000).

Windschitl (2002) identifies that contemporary views of learning suggest all acts of learning involve knowledge construction therefore, we should not speak in terms of whether or not a learning environment is constructivist but whether it represents “weak” or strong” acts of constructionism. He identifies “strong” acts of construction being when learners connect new information with existing ideas to form meaningful knowledge, creating internal coherence that can be integrated across topics and then used as a tool for further constructions. In contrast, “weak” acts of construction only loosely connect new information with existing ideas and are fragile, transient, applicable within a narrow range of contexts and often require brute force of memorization to be sustained in memory.

Research by Dart et al. (2000) on 457 secondary schools students’ conceptions of learning, the classroom environment and approaches to learning, suggest that students who reported qualitative and experiential conceptions to learning were more likely to use deep approaches to learning whereas students who had quantitative conceptions towards learning tended to use surface approaches. Amongst their recommendations were that teachers need to create environments that develop students’ qualitative conceptions of learning and that this view must be stated and evident in the daily classroom teaching and learning processes. Assessment and teaching strategies should be congruent with this perspective and learning should include regular opportunities for exploration, inquiry, experimentation and problem solving using relevant examples with which students can easily identify.

Chin and Brown (2000) examined the learning of six Year 8 Science students participating in a series of chemistry laboratory activities to ascertain a deep or surface approach to student understanding. Following a series of observations and interviews, they identified five categories that emerged as differences in learning approaches: generative thinking, nature of explanations, asking questions, metacognitive activity, and approach to tasks. Students using a deep approach to learning provided their ideas spontaneously; gave elaborate explanations describing cause-effect relationships and personal experiences; focussed their questions on understanding causes, gathering further explanations, predictions and resolving knowledge discrepancies. Students using a surface approach gave explanations that were reformulations of questions, did not refer to mechanisms but only to what was visible. Their questions focussed upon procedural information and more basic factual knowledge. Their findings suggest that to encourage deep learning, teachers should provide prompts and contextualized scaffolding, encouraging students to ask questions, predict, and explain their thought process during activities.

A literature review by Richardson (2005) identified that higher education students often choose an approach to learning based upon the content, context and demands of particular learning tasks.

He suggests that teachers can bring about desirable approaches to learning through appropriate course design, teaching methods and forms of assessment. Richardson states:

> This has been confirmed in research studies comparing problem-based learning and traditional, subject-based curricula: students following problem-based curricula are more likely to adopt a deep approach to studying and are less likely to adopt a surface approach to studying. (Richardson, 2005 p.674)

Bereiter (2002) suggests that surface and deep knowledge are only two parts of a triumvirate view of what Popper refers to as the three worlds of knowledge (Popper, 1978). For Bereiter, the first or 'physical world' of ideas and knowledge is about surface knowledge and is where much of classroom teaching is aimed towards. The second or 'subjective world' is where deeper knowledge and thinking strategies are explored. The third world is the 'conceptual' and is the constructed realities that people make from the surface and deep understandings.

Hattie (2009), suggests that teachers contribute to students only developing surface understanding because much of their evaluation and testing only requires students to reproduce knowledge rather than questions that require relational and elaborative answers. Hattie expands upon this and states:

> There needs to be a major shift, therefore, from an over reliance on surface information (the first world) and a misplaced assumption that the goal of education is deep understanding or development of thinking skills (the second world), towards a balance of surface and deep learning leading to students more successfully constructing defensible theories of knowing and reality (the third world). (Hattie, 2009 p.28)

Hattie extends this notion further by stating:

> It is critical to note that the claim is not that surface knowledge is necessarily bad and that deep knowledge is essentially good. Instead, the claim is that it is important to have the right balance: you need surface to have deep; and you need to have surface and deep knowledge and understanding in a context or set of domain knowledge. (Hattie, 2009 p.29)

With regard to music education, Scott (2006) used surface and deep learning terminology to describe levels of constructivism and pseudo-constructivism in a hypothetical class observation lesson. Scott states:

> It is incorrect to label activity-based music education as constructivist merely because students are learning by doing. To do so reflects a *surface approach* to constructivist perspectives. Rather a *deep approach* to constructivist theory requires that learning provides students opportunities to link new learning to previous understandings and to interpret this new knowledge through experience. (Scott, 2006 p.17)

Of benefit to our identification and understanding of levels of learning are Scott's contextual examples of surface and deep approaches to music learning within the areas of collaboration, questioning, problem solving and instructional planning.

A collaborative small group composition activity, where a teacher dominates each step of the problem-solving process, is an example of a surface approach to constructivist inquiry. A deep approach would be when the teacher and students become co-learners working together to increase their musical understanding through interaction and reflection on the process of making music.

Framing questions are also identified as important in providing the opportunity for students to provide surface or deep responses to learning and Scott draws upon the Watts et al. (1997) three categories of questions: consolidation, exploration and elaboration. The surface approach is identified where knowledge is transferred from teacher to student and where learning focuses upon memorizing facts and reproducing procedures learned by rote, e.g. mnemonic clef sayings and repetitive drill recognition note writing worksheets. Deeper questioning approaches suggest that when students become the questioners of observed or experienced learning activities, they apply, challenge and extend their own knowledge and beliefs. E.g. What musical and technology skills do we need to make remixed music in the dance music style? "Thus by posing their own questions students' musical thinking is challenged and their musicianship advances to more sophisticated levels" (Scott, 2006 p.19).

Within problem solving, Scott identifies that teachers should design deeper learning through creating experiences that explore their musicianship at an analytical and reflective level as well as integrates aspects of melody, rhythm, harmony, and expression. Scott also suggests that students should be actively involved in identifying and developing their own musical problems and to consider and select the musicianship skills and procedures to help solve these problems. Examples of surface approaches to problem solving include procedures that follow the lead of the teacher or other students and exhibit a narrow focus on a singular musical aspect e.g. structural form.

Planning instruction for deeper learning requires teachers to consider their learning goals and ensuring that direct teaching is balanced with student centred inquiry. She suggests that more formal musical knowledge (rules of practice, technical language, and musical structures) may best be taught through direct instruction. However, students should then apply this knowledge as listeners, composers and performers, creating and solving their own musical problems. This requires music educators to decide how to transform a step-by-step strategy to processes of meaningful inquiry and exploration for students. This is particularly relevant to Music ICT instruction in which learning activities require a balance between musical and software skill development as well as creative exploration and a musical performance or product.

Scott recognises that teachers can design student learning support to be “guided” or “open” where a more “open” inquiry allows students a greater role in designing musical problems. Scott suggests a pragmatic approach to the use of constructivist influenced teaching principles when she states:

> A teacher may use direct instruction to transmit new knowledge. (Then) Students interact within a constructivist learning environment when they apply this knowledge toward musical results. (Scott, 2006 p.20)

This notion of mixing instructional approaches suggests that observation alone is not a good indicator of constructivist approaches to teaching as any one lesson may feature a more direct instructional approach, although the overall focus of a series of lessons may indicate a constructivist influenced, student centred pedagogy (Scott, 2006).

Developing a Checklist for Pedagogical Constructivist Depth

The researcher therefore proposes, on the basis of the broad range of pedagogical evidence discussed above, that it is possible to speak of the depth of students’ learning approaches, as being either surface or deep, or somewhere on the continuum between the two. It then follows that it is possible to conceive of the Pedagogical Constructivist Depth in teacher’s learning design based on the likely learning behaviour students may adopt. This perspective will be further explored following the presentation of research data.

3.3 Preliminary Study – Identification of Authentic Music ICT Research Activity

Preliminary Survey – Music Technology Curriculum Survey

Planning for this research study had identified that a preliminary survey should be undertaken to establish the most common uses for Music ICT in the secondary school music curriculum. This chapter outlines the design, implementation, data gathering and analysis process for this preliminary study. Results from this Music Technology Curriculum Survey were used to inform what the typical 'authentic' Music ICT learning experience activity should be for the purpose of this research project.

Literature Review

The literature review established that constructivist influenced pedagogies emphasise the importance of learning through authentic activities (Bransford et al., 1999; Murphy, 1997). Music ICT is regarded as appealing and authentic by students (Crawford, 2008) and is used in a variety of ways within the secondary school music curriculum (Merrick, 2006). Williams and Webster (2006 p.408) identified a range of uses for Music ICT within schools and from their work the following researcher-devised list was created to represent a range of possible student uses for Music ICT within Australian schools.

Table 10: Categories of Music ICT Use

Categories of Music ICT Use	Examples of Music ICT Use
Guided Instrumental Instruction	Piano, Guitar, Bass, StarPlay
Game Based	Guitar Hero, SingStar, Music ACE
Internet Research	Groves, Wikipedia, BBC, TAB, Lyrics, YouTube
Audio/MIDI Composition/Arranging	Sonar, Garage Band, Acid Music, Cubase
Notation Composition/Arranging	Sibelius, Finale
Drill and Practice/Flexible Practice	Auralia, Musition
Internet Collaborative Environments	Blogs, WIKI's

From the original Williams and Webster category list, the researcher chose to merge 'Drill and Practice' with 'Flexible Practice' as user-control customising had become more common, and removed 'Teacher Resource' as it was not necessary for establishing student curriculum use. The researcher chose to divide the original ‘Internet’ category into two separate categories; ‘Internet Research’ and ‘Internet Collaborative Environments’ due to the changing use of the internet with Web 2.0 applications. Another original category ‘Exploratory/Creative’ was also divided into two new categories, ‘Audio/MIDI Composition/Arranging’ and Notation Composition/Arranging’. This decision was made based upon the researchers’ classroom teaching knowledge and experience as a clinician trainer with Music ICT. The examples alongside the categories were identified by the researcher drawing upon the same knowledge and experience.

Given this breadth of possible uses, a critical issue for the research focus was identifying and selecting which type of Music ICT activity would demonstrate the richness in pedagogy that the research project was to observe and analyse.

Music ICT Curriculum Survey

A written survey was created based upon the Curriculum Uses for Music ICT with the aim of identifying the most common uses of Music ICT in the secondary school music curriculum. An example of an anonymous completed questionnaire is provided as Appendix 10. A draft questionnaire was trialled with two teachers to ensure clarity of questions, applicability of data response and ease of completion. Five questions were formulated featuring a variety of response methods. These included: 4 point likert-type scales, hierarchical ordering and written response. The following table outlines the purpose of each question.

Table 11: Music ICT Curriculum Survey

	Questions	Purpose
1	Prioritise the following list in order of importance to your music curriculum.	Used as a cross-check to confirm the respondents order to Q.2.
2	Indicate how important each of the following uses of Music ICT are to your music curriculum.	Used as a cross-check to confirm the respondents order to Q.1.
3	What percentage of your music curriculum contact time involves the use of Music ICT?	Sought to establish the percentage of time devoted to Music ICT for each secondary year level.
4	List the Music ICT tools you most value.	Identified the software and computer hardware that educators mostly used.
5	Describe your teaching approach to using Music ICT.	Used to identify the range of teacher pedagogy.

Survey Sample Group and Distribution

A suitable sample group of music teachers was identified as belonging to the Association Of Heads of Music In Non-Government Schools in South Australia (AHOMINGS). The chairperson of AHOMINGS was approached seeking permission to distribute the survey to their membership base which comprised teachers from approximately 60 schools. Permission was granted provided that participation was voluntary and that schools would not be identified. The survey was conducted in late 2007. It was distributed at a scheduled AHOMINGS meeting and also distributed through an email list serve. Twenty two responses were received.

Survey Limitations

Results from this survey provided an insight into some aspects of the Music ICT curriculum in secondary schools but the significance of the gathered data is limited by several factors, these being; they are the views of one person on a particular day; no verification was sought as to their accuracy: and only independent non-government schools are represented. Taking these limitations into account, the survey data was used to inform the researcher of the likely best directions for the Music ICT authentic learning activity.

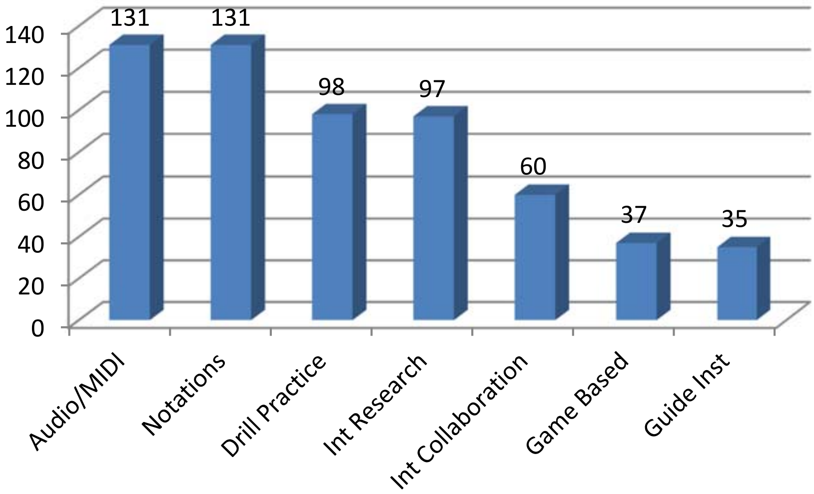
Survey Data Entry

Survey data was entered into an Excel spread sheet with most questions being coded as simple numerical values. Results of the data are supplied as Appendix 11.

Survey Findings

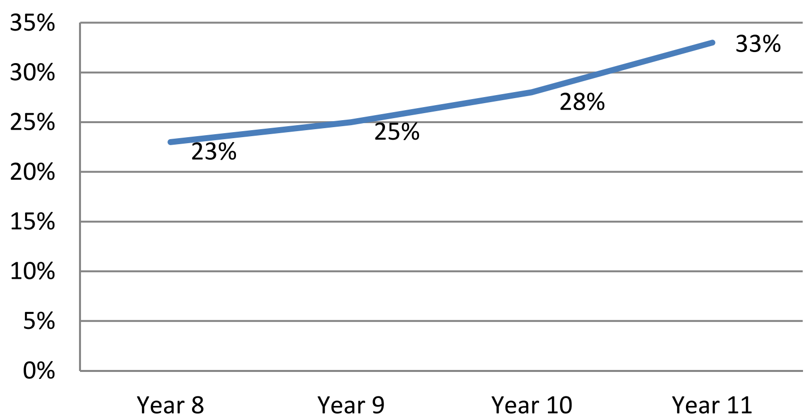
The survey established that Audio/MIDI and Notation based composing and arranging were regarded as the most important uses of Music ICT within the secondary school music curriculum. (The numerical values represent an inverse coding from most to least important, e.g. the most important software indicated by the response number 1 was assigned a value of 7, the second most important was assigned a value of 6 etc.. The least important represented by number 7 was assigned a value of 1.)

Figure 58: Music Technology Most Important Uses



The percentage of curriculum time that used Music Technology gradually increased from 23% in year 8 through until 33% in year 11.

Figure 59: Music Technology Use by Year Level



The most valued computer software tools were: Audio/MIDI sequencer (Garage Band, Sonar, Acid Music, Cubase); Audio Recorder/Editors (Audacity, Audition); Music Notation (Sibelius); Drill and Practice (Auralia, Musition and Music Theory.Net).

The question referring to teaching approach identified key words such as: model, constructivist, facilitate, tutorials, worked examples, activity sheets, mini-projects, recording, rearranging, *mixing and re-mixing.*

Survey Implications for Music ICT Pedagogy Research Project

These survey findings indicated that respondents placed a significant emphasis upon using Music ICT for activities focussing upon composing and arranging using audio, MIDI and notation software. This suggested that an authentic music learning activity for the Music ICT Pedagogy Research Project should include composing and arranging using audio, MIDI or notation software. Of particular interest was the identification of *mixing and re-mixing* as a teaching approach to using Music ICT.

Further implications from the survey identified a frequent use of constructivist pedagogy language in teachers' description of their approach to teaching using Music ICT. Examples include: active creation of music to better understand music; authentic tasks using authentic tools; scaffolding examples; student self-direction; project based learning. This encouragingly supported the likelihood of observing one of the research questions focus of identifying to what extent the teachers' pedagogy employs constructivist influenced teaching strategies.

Selection of Remix Learning Activity

An audio/MIDI based learning activity was chosen rather than a notation based learning activity as a significant number of researchers had identified that one of the powerful aspects of such activity was that students did not necessarily require music notation skills to create music (McDowall, 2008; Brown, 2007; Merrick, 2006).

3.4 Music Creation Using Audacity - Music ICT Remix Teaching Resource

A Music ICT teaching resource referred to as *Music Creation Using Audacity* (MCUA) was developed in preparation for this research study. Its purpose was to provide research participants with a complete instructional resource that could be taught using a variety of pedagogical approaches. The researcher believed an adaptable common instructional resource may provide further insight as well as comparative data, regarding the pedagogical and learning design considerations of those teachers who used the resource.

Resource Development

The resource began as a series of short activity worksheets in 2005 (Appendix 12) and evolved gradually during 2006 until late 2007. Following the selection of the Remix activity as the focus activity for the research project in late 2007 (Music ICT Curriculum Survey: portfolio section 3.3) further attention was directed into refining this resource. By January 2009, it had evolved into a 150 page, 6 Activity document with assessment and extension activities (see Appendix 13 or DVD Appendix 48 for complete resource) and freely shared via a personal web page (www.musiccreationworld.com). Much of this expansion in instructional detail and learner assistance was influenced by research into instructional design models, observation and discussion with students and teachers, constructivist pedagogy models, an analysis of worked examples and multi-media learning theories (discussed in portfolio section 4.3.4).

The general criteria for creating these activity resources were that they should:

- Be simple for students to follow.
- Engage students' imagination.
- Develop authentic musical skills.
- Accommodate learning styles.
- Allow experimentation.
- Create a performance.
- Introduce skills and techniques that can be further developed.
- Are easy to teach/adapt.
- Provide meaningful evaluation/feedback/assessment.
- Efficient with class time.

The specific music technology criteria for these activity resources were:

- Multiple entry points for students (computer/audio/music).
- Develop specific music and audio manipulation skills.
- Self-paced and self-directed.
- Are sequential and provide achievement milestones.
- Provide structured support (scaffold) that is gradually removed.
- Allows for missed lessons (absences).
- Provides a continual feedback loop (self and peer evaluation).
- Reinforces safe ICT practice.
- Does not need to be on-line.

Activity Content

The sequential activities are designed to teach general remix strategies as well as software specific skills to achieve these strategies. They use a 'guided activities' model which incorporates extended 'worked examples'. The six activities address the following topics and include the following audio editing techniques:

Table 12: Activity Topics for Music Creation Using Audacity

Activity 1	Modifying Sound Recordings	Spoken text is imported, duplicated, modified and exported. Activities include: Importing sound files (MP3), Selecting Sounds, Duplicating Tracks, Effects (Pitch Change, Reverse, Echo, Wah Wah), Track Pan and Volume, Mix Down to MP3.
Activity 2	Rearranging Text	Spoken text is imported, split, rearranged, a stutter effect added and Mix Down to MP3.
Activity 3	Microphone Recording	Activities include: Audio Settings, Microphone Recording, Low Pass/High Pass Filters, Delay, Reverb, Inserting Silence, Mix Down to MP3.
Activity 4	Assembling Drum Loops	Drum loops matched to 120 BPM are assembled into a Verse, Chorus structure. Drum loops matched to 120 BPM are assembled into a Verse, Chorus structure.
Activity 5	The Remix	A completed MP3 song is imported and modified using arranging, processing and editing techniques from Activities 1-4.
Activity 6	Your Own Remix	An own-choice MP3 song is imported and modified. Task steps are described in general terms and assessment criterions are provided.

Initially, the activities and steps are prescriptive and require the student to follow a sequential order. Some student choice is available with customising effects and editing steps during Activity 1-5, however; it is during Activity 6 that students are provided with the freedom to work in a self-directed manner, creating a remix of their own choice applying the musical techniques and software process skills included within Activity 1-5.

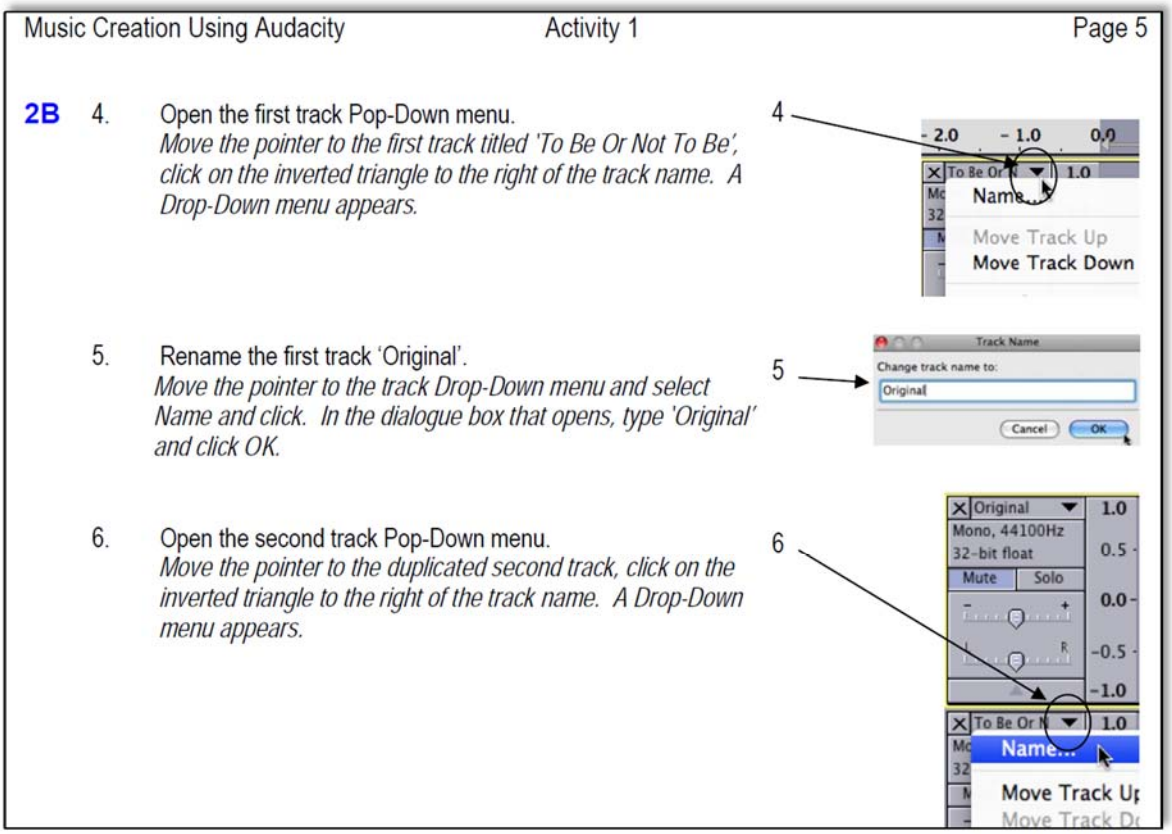
Assessing Student Learning

The Evaluation/Assessment is designed around a self-reflection and self/peer evaluation rubric with teacher moderation (see DVD Appendix 48 – Activity 1 - 8C p.24, 8D p.25 and 8E p.26). An assessment takes place at the end of each Activity. The self-reflection process involves learners writing three to four sentences explaining what section of their mix-down they are most proud of.

Instructional Design Strategy

Each of the six activities follows a similar instructional approach. This features a system of hierarchical order that divide instructions into sequential steps, e.g. Activity 1-Part 2B Step 4 (Figure 60). This results in each Step having a concise instruction followed by a more detailed 'how to' in italics, and a screenshot image with guiding arrows being provided.

Figure 60: MCUA Instructional Design Strategy


Music Creation Using Audacity Activity 1 Page 5

2B 4. Open the first track Pop-Down menu.
Move the pointer to the first track titled 'To Be Or Not To Be', click on the inverted triangle to the right of the track name. A Drop-Down menu appears.

5. Rename the first track 'Original'.
Move the pointer to the track Drop-Down menu and select Name and click. In the dialogue box that opens, type 'Original' and click OK.

6. Open the second track Pop-Down menu.
Move the pointer to the duplicated second track, click on the inverted triangle to the right of the track name. A Drop-Down menu appears.

Pragmatic Approaches to Constructivism

This directive learning approach to an instructional resource may seem to be contrary to some pedagogical interpretations of constructivist influenced student-centred learning models (Gagnon and Collay, 2006; Norton and Wiburg, 1998). However, the resource is intended to be but one aspect of the overall learning and teaching pedagogy; a resource that can be applied in a variety of ways. Jonassen (2005) and Reigeluth (2009) propose that a pragmatic approach to constructivism enables all instructional processes to be regarded as tools to aid in the construction of learner knowledge (Jonassen, 1999 p.217). Further discussion of applying a pragmatic approach to constructivist influenced Music ICT pedagogy is detailed in portfolio section 4.3.1 (p.325).

3.5 Research Design

This chapter describes the design, administration and research gathering process that was undertaken for this investigation.

3.5.1 Methodology

A qualitative research paradigm was used to investigate the pedagogical practices of secondary classroom music teachers as they designed and taught an extended music remix classroom activity using Music ICT. The study's methodology is underpinned by a constructivist learning perspective and socio-cultural theoretical framework emphasising the importance of authentic practice, context and the nature of human interactions (Salomon and Perkins, 1998). This perspective is also useful for understanding teacher pedagogy because it allows researchers to capture and examine the complexities and dynamics involved in teachers' preparation and delivery of a learning experience. In addition, sociocultural theory enables researchers to represent and illuminate insights from data on multiple individuals engaging in learning activities in their natural setting.

Data Gathering Methods

The following qualitative data gathering methods were identified by the researcher as being the most likely sources for providing an accurate representation of a teachers' design, delivery and personal reflection process:

- questionnaires
- observations of lessons
- interviews
- examination of curriculum/lesson documents

Questionnaires

Four questionnaires were designed for this research investigation. Each featured a range of open-ended questions and occasional Likert-type scale questions which encouraged the research participant to explain, describe and indicate their views on preparing and delivering their Music ICT remix learning activity. This style of questioning is identified as a feature of qualitative based questionnaires (Cohen et al., 2007). Initial planning and development of the questionnaires involved a process of comment and feedback from research supervisors in addition to having several teacher colleagues complete the questionnaire. Improvements included: formatting suggestions; improved sequencing of questions; improved clarity and focus within questions; framing response styles; and identifying repeated question themes for inclusion in the subsequent questionnaires. To provide an example as well as additional source reference material for the reader, the appendices include the four completed questionnaire responses for the research teacher referred to as Mick.

A *Preliminary Research Questionnaire* (Appendix 14) was used to identify teachers who would provide the range of teaching and Music ICT experience desired for this research. Results from this questionnaire are not included within the data set as similar questions were included in Questionnaire 1.

Questionnaire 1 - Investigating Music ICT Pedagogy was the first research questionnaire (Appendix 15) and was completed prior to the participants' designing (planning) their 'remix' learning activity. This questionnaire provided background information regarding the research participants' teaching and Music ICT experience; teaching context; attitudes towards Music ICT; and teaching and learning philosophies.

Questionnaire 2 (Appendix 16) was completed prior to the delivery of the 'remix' learning activity. This questionnaire identified the participants' learning design preparation; expectations regarding teaching the learning activity; ICT equipment expectations; and expected responses from students towards the activity.

Questionnaire 3 (Appendix 17) was completed at the conclusion of the 'remix' learning activity. It identified each participant's views on their own pedagogy, student learning, and issues that influenced the way the learning activity progressed.

Classroom Observation

Two classroom observations of each participant were conducted by the researcher. The researcher took on the role of a non-participant observer (Robson, 2002) minimising interaction with teacher and students while taking handwritten notes and filming the lesson using a static camera. These notes were procedural descriptions with indicators of pedagogical and constructivist points of interest being identified. The audio of the filmed lesson was later transcribed and the handwritten observation notes were combined into one observation document (Appendix 18, and Appendix 19).

Wragg (1994) claims that "good classroom observation can lie at the heart of both understanding professional practice and improving its quality" (p.16). Wragg suggests that a researcher's approach to recording observations is important for establishing verifiable information to support their reflection upon events. Wragg considers that a combination of recording approaches, such as: a written classroom account; a video cassette (movie); and a transcript may provide a range of advantages for enabling deeper analysis of the observation. In classroom observation situations, research by Samph (1976) cautions that teachers and students do change their approach to teaching and learning by attempting to exhibit behaviour and actions they think the observer expects. Through the use of multiple methods of data gathering, as well as two lesson observations with film reference, the researcher was confident that this influence was reduced or minimized.

Interview

Three interviews were conducted with each research teacher. The first interview occurred sometime prior to the first 'remix' lesson. The second and third interviews followed each lesson observation. Each interview was conversational in style and was recorded on video and later transcribed. Questions were generally exploratory or seeking clarifications of issues identified in questionnaires or referring to events that occurred during the lesson observation (Appendix 20, Appendix 21, and Appendix 22).

Document Analysis

A range of primary source documents created by each research teacher were collected by the researcher during the two observation visits. These documents included: course overview, lesson plans, student task sheets and instructional resources (Appendix 23).

Bowen (2009 p.30) suggests that there are five specific functional uses for primary source documents within qualitative research. They "provide background and context, additional questions to be asked, supplementary data, a means of tracking change and development and verification of findings from other data sources" (p.30). Content and thematic analysis is generally undertaken to establish the purpose and meaning of each document.

Within this research, each collected document was used to inform and clarify observed and discussed pedagogical practice, using the researcher developed 'Dual Lens' analysis model explained in section 3.5.3 (p.183).

Data Collation

A folio of research data was assembled for each research teacher. Each folio included: three questionnaires, two lesson observation transcriptions, three interview transcriptions, and primary documents such as lesson plans, task sheets and instructional resources. The transcription of observations and interviews were performed by the researcher a process which took approximately 18 months. An example of such a research data folio is provided for the research teacher Mick (see DVD Appendix 49).

Data Analysis

Qualitative research studies frequently analyse evidence from a particular focus or viewpoint, which is regarded as using an 'analytic lens' (Lichtman, 2010; Chase, 2005). Published music education research also uses this analytical approach (Burnard and Younker, 2008; Merrick, 2006). Within this research study, a dual analytical lens model was used to examine the data evidence from a pedagogical and constructivist viewpoint. The use of multiple data gathering methods also enabled the use of triangulation analysis.

Triangulation is generally regarded as a process of using multiple perceptions to clarify and verify the meaning from an observation or interpretation (Stake, 2005). Although no observation or interpretation is perfectly repeatable, triangulation does serve to clarify meaning by identifying different ways in which the phenomenon is being seen (Silverman, 1993). Analysis of multiple sources of data which concur with each other, also provides the researcher with greater confidence as to the validity of their interpretation (Lin, 1976).

Research Timeline Summary

Planning for the data gathering began in early 2008. A research design proposal was developed, ethics approval sought, and potential research participants identified. In late January 2009, formal invitations were sent to 12 teachers identified from the earlier survey as representing a cross section of teaching experience, Music ICT knowledge, and demographic contexts. Two teachers withdrew before the research began. A research training and information session was presented to the remaining 10 research participants during March 2009. The data gathering commenced during April 2009 (commencement of term 2) and was completed by the end of August 2009 (midway through term 3). Analysis of the research data began in late 2009.

Ethics and Participation Approval to Complete the Study

Ethics approval to conduct this research was granted by the University of Adelaide and permission was sought and granted by the South Australian Department of Education and Children's Services (DECS) allowing research to be undertaken in DECS secondary schools (refer to Appendix 24).

Participants were provided with a detailed outline as to the nature of this study and the extent of their involvement. They were given the option of removing themselves at any time from the research should they wish to discontinue. Their consent was received prior to the commencement of the study (refer to Appendix 28).

Participants informed students of the researcher's purpose and presence and students were given the option of continuing their remix work in another computer laboratory or classroom space. No students chose to remove themselves from the observed lessons. The regular classroom interaction between teacher and student was recorded and any student comments made during this time was assigned a non-gender based student number. No students were interviewed or their personal work examined during this research.

Selection of Research Teachers

The research design required the participation of a group of secondary music teachers that represented a balance of the following qualities: a breadth of teaching experience, experience using Music ICT, some experience teaching with Music ICT, as well as a willingness to discuss their pedagogy.

In November 2008, eighteen secondary school music teachers from Government and Non-Government schools responded to an email invitation for teacher research participants for a study investigating secondary school Music ICT Pedagogy. Each of the responding teachers was then sent via email, a preliminary research questionnaire to complete (Appendix 14). This questionnaire was intended to identify teachers who would provide the range of teaching and Music ICT experience required for this research. Twelve teachers returned their completed questionnaires by early December 2008. Encouragingly, their responses contained a healthy cross section of the desired research participant qualities, listed earlier. A formal invitation to participate in the research was sent to the twelve teachers during late January 2009.

The formal research invitation contained five documents detailing: the research invitation (Appendix 25); the research focus and process (Appendix 26); an explanation of the Music ICT activity resource (Appendix 27); consent to participate in the research (Appendix 28); the first research questionnaire (Appendix 15).

Teachers were personally contacted by the researcher during early February 2009 confirming involvement and encouraging them to complete and return the consent and first questionnaire form. It was at this time that two teachers withdrew from the formal research, one due to moving schools and another to no longer teaching a year level appropriate for the research.

Research Training Session

A research training session was held for the remaining ten teachers during late March 2009 (Appendix 29). This session allowed for face to face discussion regarding the research procedures, data collection and provided 'hands-on time' using the *Music Creation Using Audacity* (see DVD Appendix 48). This proved important for several teachers as this allowed them guided time using the instructional resources, as well as thinking and discussion time on possible approaches for tailoring these resources to suit their school context.

3.5.2 Overview of Research Participants

The following overview of research participants is mostly drawn from information gathered from *Questionnaire 1 - Investigating Music ICT Pedagogy* (Appendix 15). The names of the participants have been changed to ensure anonymity but their gender has remained the same. Several data tables have been included within this chapter; however, most tables are included within the Appendix as their content is referred to within the presentation of research data (chapter 3.6).

Teachers and Their School Contexts

A summary overview of the ten participants and their school contexts are provided in Table 13. The table highlights a spread of ages ranging from one teacher in their twenties, four in their thirties, four in their forties and one in their fifties. Eight of the ten teachers have ten or more years of secondary school music teaching experience. The teaching classes were predominantly Year 9 and 10 music elective classes with seven having a fairly even gender balance. The socio-economic school status is the view of the research teacher provided during an interview. The Index of Community Socio-Educational Advantage (ICSEA) as listed in the My School website (ACARA, 2013) is also provided as a further indicator. An average value is regarded as 1000.

Table 13: Research Participants and their School Context

Name	Teaching Role	Age	Teaching Experience	School Information – Socio Economic and ICSEA	Research Year Level	Student Class Numbers
Michelle	Senior Music Teacher	50s	10+ years	R-12, mid SE 976	9 Elective	9 (9G)
Brenton	Music Teacher	40's	10+ years	8-12, low SE 1015	8 Elective	17 (8G/9B)
John	Senior Music Teacher	30's	10+ years	8-12, low SE 984	9 Elective	21 (6G/15B)
Ryan	Senior Music Teacher/Media	30's	5+ years	8-12, low SE 994	9 Elective	15 (7G/8B)
Simon	Senior Music Teacher	30s	10+ years	7-12, high SE 1144	7 General	24 (10G/14B)
Susan	Senior Music Teacher	30s	10+ years	R-12, low SE 990	9 Elective	20 (9G/11B)
Trevor	Senior Music Teacher	40s	10+ years	8-12, low SE 1001	9 Elective	19 (8G/11B)
Mick	Music Teacher/Media	40's	10+ years	R-12, high SE 1117	10 Elective	8 (1G/7B)
Tina	Senior Music Teacher /English	40s	10+ years	R-12, low SE 1019	9 Elective	19 (10G/9B)
Rebecca	Music Teacher	20's	5+ years	R-12, low SE 976	10 Elective	23 (13G/10B)

Research Teachers Remix Activities and Teaching Facilities

An overview of each teacher's choice of 'remix' activity, software program, and details regarding their ICT teaching facility is provided in Table 14. Six of the ten research teachers chose to use the researcher created *Music Creation Using Audacity* instructional resource with the remaining four choosing to design their own learning activity and instructional resources. Six of the ten research teachers used a purpose built Music ICT facility while three used general purpose ICT computer rooms. The specific features of each facility varied with the three most notable differences being the presence or absence of: class audio speakers; MIDI keyboard; and data projector. All facilities used networked computers with eight using a variety of PC computers while two used Mac laptops and iMacs.

Table 14: Research Teachers' Remix Activities and Teaching Facilities

Name	Remix Activity	Software	Teaching Facility
Michelle	Music Creation Using Audacity	Audacity (Sourceforge)	Music ICT computer lab , 24 networked PC computers, on board sound card, mounted data projector, MIDI keyboards, class audio speakers.
Brenton	Music Creation Using Audacity	Audacity (Sourceforge)	Music ICT computer lab , 22 networked PC computers, on board sound card, portable data projector, MIDI keyboards, class audio speakers.
John	Music Creation Using Audacity	Audacity (Sourceforge)	General Purpose computer lab , 24 networked PC computers, on board sound card, portable data projector, no MIDI keyboard, no class audio speakers.
Ryan	Self-Developed 'Kryptonite exemplar'	Audition (Adobe)	General Purpose computer lab , 25 networked PC computers, on board sound card, portable data projector, no MIDI keyboard, no class audio speakers.
Simon	Self-Developed 'Wiggles MIDI file remix'	Garage Band (Apple)	General Purpose computer lab , 18 networked iMac computers, on board sound card, mounted data projector not working, no MIDI keyboards, class audio speakers.
Susan	Self-Developed '12 Bar Blues remix'	ACID Music (Sony)	Music ICT computer lab , 14 networked PC computers, on board sound card, mounted data projector, no MIDI keyboards, class audio speakers.
Trevor	Music Creation Using Audacity	Audacity (Sourceforge)	Music ICT computer lab, 22 networked PC computers, on board sound card, mounted data projector, MIDI keyboards, class audio speakers.
Mick	Self-Developed "Fall Out Boy"	Garage Band (Apple)	Music ICT computer lab, 7 networked iMac computers, student owned MacBook laptops, mounted data projector, MIDI keyboards, class audio speakers.
Tina	Music Creation Using Audacity	Audacity (Sourceforge)	General purpose computers in school library, 8 networked PC computers, on board sound card, portable data projector, no MIDI keyboard, no class audio speakers.
Rebecca	Music Creation Using Audacity	Audacity (Sourceforge)	Music ICT computer lab , 12 networked PC computers, on board sound card, mounted data projector, no MIDI keyboards, class audio speakers.

Additional Research Participant Information

Seven of the ten teachers identified constructivist/constructivism/constructionism as a teaching and learning influence while student-centred teaching strategies were also identified as influential (Appendix 30). Seven of the teachers identified themselves as competent with ICT proficiency while three identified themselves as very competent. With regard to Music ICT proficiency, four identified themselves as fundamental, two as competent and four as very competent (Appendix 31).

3.5.3 Dual Lens Analysis Model

First Lens: Pedagogical Reasoning

Evidence gathered from the questionnaires, teaching documents, observations and interviews were analysed with regard to the teachers' design and delivery for their learning topic. A pedagogical case list was compiled for each research participant. Planning and teaching events were categorised by the five stages of the Shulman/Webb Pedagogical Reasoning Stages. Within this study, the analysis has been organised into two presentational parts:

A) Designing the Learning Experience – includes the Comprehension and Transformation stages

B) Delivery of the Learning Experience – includes the Instruction, Evaluation and Reflection Stages

Critical reflection on each of these stages identified what pedagogical considerations were being made and if any of these indicated pedagogical content knowledge unique to Music ICT teaching.

Second Lens: Checklist for Pedagogical Constructivist Depth

A second analysis of the gathered data then examined the evidence for pedagogical examples that matched the constructivist category indicators contained within the researcher adapted Checklist for Pedagogical Constructivist Depth. A constructivist case list was compiled for each research participant. Each category is discussed with regard to what the researcher believed would be the likely learning approach adopted by the students; applying the definitions discussed by Dart et al. (2000) and Chin and Brown (2000).

The coding of categories used the following labels; deep understanding, surface understanding, or not represented. Multiple examples of particular indicators as well as a stronger degree of emphasis towards some characteristics were regarded as an indication of pedagogy that was promoting deeper student understanding. Some categories were not represented within the design of the learning activity or the teaching pedagogy.

The researcher contends that it is the depth of the teacher's pedagogical design that produces the likely depth of students' learning approaches. Therefore, the results of this second lens analysis are referred to as the teachers' Depth of Constructivist Learning Design.

3.5.4 Pedagogical Reasoning Model and the Remix Learning Activity

The following is a contextualized explanation and discussion of the Pedagogical Content Knowledge process steps (Webb, 2002) as applied to the 'remix' research activity. This discussion highlights important indicators that were applied using the Dual Lens Analysis model. Shulman's headings have been modified to fit this study.

Part A: Designing the Learning Experience

Comprehension of Remix Topic and Music ICT:
Shulman considers that teachers should first understand what they teach and if possible, understand it in several ways. This understanding should be extended to how the given idea relates to other ideas within the subject and then can be further extended to interrelationships with other subjects.

> The key to distinguishing the knowledge base of teaching lies at the intersection of content and pedagogy, in the capacity of a teacher to transform the content knowledge he or she possesses into forms that are pedagogically powerful and yet adaptive to the variations in ability and background presented by the students. (Shulman, 1987 p.15)

For this research, it is therefore important to identify how well teachers understood the educational and musical purpose of the remix learning activity as well as the variety of ways that a remix could be represented. There should also be recognition of how the remix activity applied to other areas of the music curriculum and possibly the conceptual links to other subjects (e.g. the reordering of values in Maths or structural rearrangement in Art and Design). Another important aspect will be the teachers' understanding and competency with using the available Music ICT equipment and software (with a particular focus upon Audio and MIDI sequencers) as well as their comprehension of the affordances of this Music ICT equipment to produce a remix (how easy it is to produce a remix using the software).

Transformation of Knowledge into a Teachable Form:
Shulman suggests that through a process of reasoning steps (not necessarily sequential), teachers transform their comprehended ideas of the subject matter into a form that can be comprehended by others. The following transformation steps represent the essence of pedagogical reasoning, the intentional planning through teaching as thinking – or designing the learning.

The preparation stage involves the teacher applying their understanding of the topic to an examination and critical interpretation of relevant instructional materials and consideration of the 'appropriateness' for structuring and segmenting the material into a form more suitable for their teaching. During the preparation process for the remix activity, teachers were likely to search for available resources, such as the supplied 'Music Creation Using Audacity' activity and consider if these were appropriate for their educational purposes or goals. The teachers' values and beliefs, personal experiences with equipment as well as knowledge of available Music ICT resources may have influenced the direction this preparation took. It is likely that teachers would have taken notes and identified key concepts and specific audio editing skills they believe would be required to successfully create a remix. At this point, they were likely to decide whether they would create or combine their own teaching resources or use the provided *Music Creation using Audacity* resources.

The representation process involves thinking of a range of ways that the key ideas and skills can be represented and made accessible to the students. Shulman suggests that multiple forms of representation such as analogies, metaphors, examples, demonstrations, simulation and the like are important for building a bridge between the teacher's comprehension and that desired from the students. Representing what an audio-remix is suggests that audio-based examples identifying finished and successful examples from a range of audio sources (iTunes or YouTube) are likely representations. Additional sources may be curriculum knowledge (pedagogical content knowledge) and resource models offered by other 'expert' educators (these could be commercially available or freely shared). Teachers needed to identify suitable software for exploring and developing the ideas and skills for their remix activity, as well as set suitable activity contexts in which to develop these.

During the instructional selection process, the teacher moves their focus from the reformulation of content towards the embodiment of these representations using instructional approaches and strategies for learning that suit the content. Shulman suggests that this instructional repertoire could be quite rich and may include the more conventional lecture, demonstration approach through to discovery learning, project methods, cooperative learning and Socratic dialogue. This selection process also requires the teacher to consider their knowledge of learners' ideas, values and beliefs, as well as their own pedagogical knowledge and pedagogical content knowledge. This suggests that we should not assume that constructivist approaches are always the best for all types of learning (Somekh, 2007; Somekh, 2001).

This is a significant process stage as the range of instructional choices that were selected would shape the demonstrated pedagogy that was to be analysed during the research project. Choices the teacher may have considered during the instructional selection process may have been: how the remix knowledge skills and process could be learnt most effectively, how Music ICT technology could facilitate learning, their own general theories of how children learn, the differences in student learning styles as well as the different dispositions children had towards learning.

As the teachers involved in this research were aware that constructivist influenced pedagogies were one of the features that this research was focussing upon, it is possible that some teachers may have adjusted their teaching style to reflect a more student-centred approach. I believe the data gathering design (interviews, questionnaires and observations, analysis of their teaching preparation, delivery, assessment and reflection) would make it unlikely they could significantly alter their regular approach to teaching a Music ICT unit of work.

Shulman indicates that adaptation is the process of fitting the identified teaching material and instructional styles to the general characteristics of the students. He explains that the teacher must take into account their abilities, gender, language, culture, motivations and prior knowledge and skills, as well as anticipate their response to different forms of representation and presentation. Shulman highlights the way in which student conceptions, misconceptions, expectations, motives, difficulties and strategies may influence the ways in which they approach, interpret, understand or misunderstand the learning material. Within this research, it was of interest to note how teachers adapted and modified instructional resources like the supplied MCUA or how they created their own activity and instructional resources to best suit the general characteristics of their class.

Tailoring is the final step in the transformation process and it involves fitting the learning activity (representations) to a specific group of students; generally a class but this could be a smaller class subset or possibly individuals. This could be represented by task differentiation for individuals or small groups, e.g. skipping activity units, remixing different songs, creating a completely unique learning activity.

Part B: Delivery of the Learning Experience

Instruction of Class:

Shulman sees instruction as the observable performance of a variety of teaching and class management activities. These activities include: organizing and managing the classroom; presenting clear explanations and vivid descriptions; assigning and checking work; interacting effectively with students through questions and probes, answers and reactions and praise and criticism. Shulman also emphasises that there are relationships between the comprehension of a new teacher and the styles of teaching they employ. He highlights one example of a trainee teacher changing from a flexible interactive style to a didactic teacher-directed style when their topic comprehension is limited.

This suggests that for this research, the observed behaviour of the teacher and their pedagogical reasoning may be unique to this learning activity unit. Their own confidence and experience and values and beliefs regarding Music ICT, as well as the environment in which they taught may be very different from the way in which they approach other non-Music ICT related teaching units.

Evaluation and Assessment:

Shulman recognises that the evaluation of student learning is but one aspect of this process and he includes all of the regular checking for understanding and misunderstanding that a teacher employs through interacting with students as well as the more formal testing and evaluation teachers use to provide feedback and grades. He suggests that to recognise and evaluate understanding the teacher requires a deep grasp of both the material taught and the process of learning. Another aspect is teachers' self-evaluation directed towards their own teaching and at the lessons and materials used in the learning activities. Webb (2004) also considers that the teachers' ideas, beliefs and values influence their approach to evaluation and its purposes.

The audio-remix activity provided a range of assessment and evaluation opportunities for teachers. These included: criteria and rubrics to identify and measure student achievement, self and peer assessment, reflective writing or presentations, summative audio-remixes, ongoing interwoven assessments, formative and summative tasks. This study also examined the factors that influence a teachers' evaluation of student learning with Music ICT and of particular interest was the assessment approach of those teachers who identify themselves as not being as familiar with the audio-remix genre or the affordances of the chosen software.

Reflection on the Designed Learning Experience:

The final step in this pedagogy reasoning process is reflection and it is where the professional learns from their experience; comparing the learning outcomes with the intended purpose. This reflection could be an individual or paired process and it may include recording devices or simply a recall of one's memory. This too may be influenced by the teachers' ideas, beliefs and values.

Although the reflection process is likely to have been ongoing throughout the remix activity lessons, the teachers' reflective thoughts were gathered through the second and third interview as well as the third and final questionnaire.

3.5.5 Pedagogical Content Knowledge and the Remix Learning Activity

Following is a contextualized explanation and discussion of the researcher developed Pedagogical Content Knowledge Indicators as applied to the 'remix' research activity. These indicators are discussed with reference to potential examples of Music ICT knowledge that may only be used for Music ICT teaching and are not likely to be used for other general music education teaching or for professional music making. The indicator headings have been modified to suit this study.

- Definition of culturally agreed understandings of remix concepts

This could be represented in the teacher's understanding of the breadth of possible approaches to remixing music. This understanding could be informed by knowledge regarding the historical origins of remixing music as well as its use within current youth music trends. It could also be knowledge of the recording technologies and software processes used to create the various styles of remix music. This content knowledge may be represented within their pedagogy by; playing a range of remix examples demonstrating the breadth of possibilities; facilitating class discussions that highlight stylistic features; identifying remix concepts such as extension, embellishment, and transformation.

- Arrangement of learning experiences through structured guidance

Of interest here is identifying the similarities and differences between teachers' approaches to designing learning experiences represented within course, lesson plans and assessment outlines. Other representations could be the structuring of listening and discussion to focus upon the connection between musical effect and production process. Recognising how this pedagogical knowledge is transformed into a guiding framework supporting students' construction and demonstration of conceptual understandings of remix skills and processes will be of importance to this study.

- The sequencing of skills and content to make understanding more likely

This could be demonstrated in the way a teacher identifies and creates a learning sequence of skills and processes with the intention of making remix concepts better understood and more appropriately used within the students' musical remix. Another representation could be within the clarity of instructional resource design as well as their consistency with connecting musical outcomes to software processes.

- Anticipation of likely student learning behaviour

The teacher's general pedagogical knowledge regarding student learning behaviour may be represented through general classroom procedures; however, more specialised content knowledge may be represented by the way that they anticipate and plan for likely student learning behaviour. This may be evident in the way they approach skill development instruction and also the way they present concepts and process skills in a variety of ways to accommodate different learning approaches and learning needs. The manner they engage, sustain and re-motivate students using learning milestones and build student confidence and self-efficacy. It may also be represented by approaches to support student learning following absence or through facilitating the revision of software skills and processes.

- Identifying prior student knowledge and understandings

This may be evident through a teacher's questioning and listening techniques; specifically how they acknowledge or lead students to develop and use musical and technical terminology to describe remix processes. Another way could be through designing opportunities for students to demonstrate and share process skills with the teacher and class.

- Identifying indicators of misconceptions or likely misunderstandings

Misunderstandings and misconceptions may be revealed through the inappropriate use of musical and technical terminology as well as inappropriate application of processes. Likely misunderstanding may occur within concepts such as rhythm, beat and upbeats; represented by wave loop editing processes such as snap and quantize values.

- Assessing learning and understanding

Formative and summative assessments are likely to be typical practices for all teachers; however, specialised knowledge may be represented through the creation of criteria closely linking musical concepts to specific process skills. Analysis of the assessment design may provide insight into a broader range of assessable approaches such as personal peer and teacher assessment using criteria or rubric based evaluations that have less or more specific detail. Other indicators may be a teacher's confidence and ability to discern the use of remix concepts and processes within a student's remix and the knowledge to see beyond grammar and recognise demonstrated and appropriate understanding within written explanations.

3.6 Presentation and Discussion of Research Data

The data is presented and discussed as a series of story narratives. Three specific teaching stories have been selected which encapsulate many of the pedagogical considerations evident in other research teachers' approaches. These are: Mick, Tina and Rebecca. The remaining seven teachers' experiences are summarised within two additional stories, with teachers grouped in the following way: those that adapted existing instructional resources (four teachers) and those that created their own instructional resources (three teachers). This presentational choice was selected by the researcher following a preliminary analysis of the assembled evidence that suggested teachers who created their own instructional resources approached their preparation to teaching and instruction differently to those who adapted existing resources.

Each story presents the pedagogical evidence using a dual lens perspective; firstly, the Shulman/Webb Pedagogical Reasoning model and secondly, the researcher adapted Checklist for Pedagogical Constructivist Depth. The evidence from each of these perspectives is then summarised and discussed with respect to the three research questions.

1. What are the teachers' pedagogical considerations during this learning experience?
2. Can specific examples of pedagogical content knowledge unique to Music ICT be identified?
3. To what extent does the pedagogy reflect constructivist influenced teaching strategies?

These discussions are limited by the apparent lack of comparable studies in music education that seriously examine music pedagogical content and curriculum knowledge (Colwell, 2011 p.125).

3.6.1 Mick's Story

Mick and His School Context

Mick has been teaching for more than 10 years and is aged in his forties. He works in a co-educational K-12 school that has a strong ICT focus and is situated in a high-socio economic area. His school requires students from year 7 to year 12 to own a personal notebook computer that is consistently used in all subject areas. Mick currently teaches across a range of subjects including: music classes in years 9, 10 and 11; film making for Year 10 and 11; and also two half days as an IT instructor within the Primary school.

The facility in which he taught his Music ICT remix project was a purpose equipped room with 14 MIDI keyboard workstations and 7 iMac computers. Each workstation had USB MIDI and Digital Audio connectivity for student notebook computers, as well as good quality headphones. The facility allowed for both wired and wireless connectivity to the school network and the internet. There was a mounted data projector and studio monitor speakers.

<u>Teaching Class:</u> The observed class was a Year 10 music class (students 15-16 years of age) consisting of 7 boys and 1 girl.

<u>Music ICT Remix Activity:</u> Mick designed his class's learning activities based upon using an existing song called *America's Sweethearts* by the band Fall Out Boy. Students were provided with audio song stems (individual, instrument specific, audio tracks, mixed from the original recording session) for the song and were expected to creatively combine new rhythm and harmonic progressions using pre-existing audio and MIDI loops.

First Lens Pedagogical Reasoning - Part A: Designing the Learning Experience

Comprehension of Remix Topic and Music ICT:

Mick identified his teaching and learning influences to include: constructivist philosophies, self-directed and individual paced learning and peer mentoring. He regarded Music ICT as a tool for exploring and developing musical literacy and, with a little help, he believes most "kids" can teach themselves how to use the software. Mick's teaching intention was to focus students upon the music they are producing and not so much the device. The Music ICT tools he valued most included: Garage Band, Sibelius, Music Theory.Net, MIDI keyboards, Digital Interfaces and QuickTime.

He has attended numerous ICT training sessions and describes himself as very competent with using ICT and Music ICT. He would regularly use Music ICT for school related composing and arranging tasks and only occasionally outside of school. He used a personal notebook computer for much of his personal teaching preparation and took this to all of his classes. This was used for both administrative tasks like student roll and mark collating as well as a teaching resource. Mick regularly prepared his own activity worksheets, tutorials and task sheets and regularly used multi-media activities within his classroom teaching. He routinely has students submit work via email, communicates with his class electronically via a school email interface, and deposited lesson activities and resources in a school server location that students can access remotely. He reports that in his teaching he occasionally uses PowerPoint style presentations with his classes. He occasionally uses rubrics for evaluation and assessment and occasionally employs student peer-mentoring. Mick currently does not use student peer-assessment.

Transformation of Knowledge into a Teachable Form:

<u>Course Preparation:</u> Mick was enthusiastic about the remix topic. He had recently heard of 'Song Stems' for Garage Band files and he was confident that using these wave loops, he could develop a learning activity which would motivate students to further develop their musical and audio skills. To prepare for this course, Mick decided to create his own remix and use this as a way of identifying what musical and audio skills students were likely to need. He indicated that he spent several hours preparing just this part of his course planning and that it took several attempts to create a blend of loops that he was satisfied with. He identified that he conducted a Google search for Apple Song Stems and was surprised that the available range was not as wide as he had hoped. He chose to explore the remixes that had been uploaded to YouTube for a song by 'Duran Duran' and 'Fall Out Boy'. He regarded this process as very important for his own personal skill development and to allow thinking time for planning his teaching process.

> I have found that I'm more helpful to students and I think I teach better if I have a good understanding of the finished product. For me, that means doing it myself and experimenting with various ways and that helps me think through how to get this stuff across to kids.

He created a completed example that he was to use in his introduction to the remix topic in addition to a one page course overview that contained written information under headings such as: 'Finding a new concept', 'Form and Texture' and 'Adding Spice' (Appendix 23).

With regard to ICT support, he was confident that his familiarity with his ICT teaching room, experience with Music ICT software and Network management skills he could solve any computer or software issues 'on the spot'.

Representation of Ideas: Mick considered that the learning activity should focus students upon musical ideas rather than ICT processes. He believed the best way to represent to students what a remix is, was by listening to a range of them. He found through his own research that YouTube provided a broad range of examples. Through his personal experimentation preparing the learning activity, Mick identified that the original vocal track melody and phrasing was a critical element in achieving a recognisable remix. To represent and reinforce musical concepts such as structure and harmony, he prepared a chord chart resource for the original song so that students could transpose their free choice loops to better fit with the melody. Mick also created a 'skills list' that identified to students the required technical skills or competencies he considered important for completing this activity.

Instructional Selection: He decided that all students would work on the same song stem and his reasoning behind this was that it would provide a common reference point for all students and also keep lesson preparation and learning supervision more manageable. He was confident that there would be enough learner choice and control and ownership of the activity through students adding additional free choice loops, editing and mixing.

He identified that much of the skill development within this activity would occur initially as teacher directed and then through modelled student coaching. This would initially be whole class focussed followed by student experimentation within their remix.

Mick was considering creating and using skill development training videos with the class but had 'ran out of time' to prepare these. He thought tutorial videos were valuable on a certain level and although he had not used any for music teaching he had used them for an introduction to video editing classes but finding relevant and specific ones is always a challenge.

> The Apple tutorial stuff (from the iLife suite including Garage Band) I find is really nicely put together. It doesn't delve into too much detail and doesn't insist on a step by step sort of thing. It just says if you want to do this, then do this. It just flows through it in the simplest possible way and again it's more about this is what you can do and I suppose you can try and follow what I've done here and you'll get the same sort of thing. I haven't really tried to make my own for teaching videos although I assemble a lot of videos for school promotions. The more precise ones (tutorial videos) I haven't

> really used because of blocks on YouTube and I find it easier to guide students or direct other students to find solutions.

Adaptation: He adapted two resources to develop this unit of work. The existing song stems for 'America's Sweetheart' by Fall Out Boy and YouTube examples of a range of remixed songs. He identified that he auditioned a range of songs and decided upon using 'America's Sweetheart' as it was both a current popular song of the time and seemed to offer a range of remix options. Of interest was he was to later find that only half the students recognised the original song.

Lesson Plans: Mick created a brief course outline and was planning to complete the remix activity within seven lessons. He did not create individual lesson plans but it was evident from the two observed classes that he had developed a clear learning intention and strategy for each lesson and, by keeping a flexible structure, this allowed him to respond to student and class feedback while still moving the class group towards the focussed learning.

Tailoring: All students remained within the same remix activity but it was evident that Mick expected he would need to tailor or individualise skill coaching depending upon the variety of directions students took their remix.

> I want the kids to explore a variety of loop styles and blends and so each one (remix) is going to be different and I reckon it would be fair to expect some students will want to create their own loops from other songs so I guess I'll cross that bridge with them later.

First Lens Pedagogical Reasoning - Part B: Delivery of the Learning Experience

Instruction of Class:

The first and fourth lessons were observed out of a total of five classes devoted to this learning activity.

The first observed lesson demonstrated a teacher directed class discussion of the learning activity. A significant amount of time was devoted to exploring and framing the learning activity.

Mick had pre-connected his note book and data projector and was prepared to start the lesson as soon as the students had assembled. As they entered he directed students to log-on to their class workspace and download the course overview and a large 200MB resource file. The class attendance roll was taken informally during this process and a student absence was queried.

Mick had decided to introduce the learning topic through played examples and class discussion while concurrently having students upload their resources. He began by recounting a previous class discussion about remixes and then asked students to focus their listening upon identifying and describing the musical style and blend of instrument and vocals contained within the first 2 minutes of the radio mix version of 'America's Sweetheart'. He used short, open questions directed towards individual students and moved these discussions along quickly. He then moved into the body of the lesson which was providing students with listening experiences and discussion to develop a shared understanding of the language and style of remixed songs. This occupied a third of the lesson time.

Mick: (Speaking to Student 1) What's been added to this remix?

Student 1: They added a piano bit that was really distracting.

Mick: Did you think it suited the style of song they were doing?

Student 1: No, because they had those really heavy drums and it sounded like it was going to be a bit …

Student 2: Doof

Student 1: Yeah like that, I don't really know how to describe it, and then they come in with this piano bit and it's all up the top. It just sounded weird, or maybe it was just too loud

Mick: I thought it was a good idea, but maybe poorly executed in the mix maybe. Did anyone hear something that was maybe missing from what (student's name) heard?

Student 3: There was not much guitar?

Mick: Yeah but there is something else that is absolutely critical. Let's hear if you can notice after listening to another.

This example demonstrates the type of questioning and analysis he was expecting students to consider. This discussion also provided Mick with an insight into current student understanding of musical perception.

During this listening and discussion period, students regularly mentioned technical complications with accessing the resources. Examples included: the download file being too large, their personal notebook was in for repair, they did not have the current version of Garage Band, students not knowing their password and using someone else's login, their computers not having a firewire port for fast data transfer.

He had planned to have each student begin auditioning the wave files within a pre-saved Garage Band template however, twenty-five minutes into the lesson, Mick decided to change his planned teaching approach as it had become apparent that the transfer of audio resources to the student's laptops was progressing slower than anticipated.

He chose to use his own computer which was being used with the data projector to have students model the audition and blending process with verbal assistance from other students and himself.

At this point he directed students to refer to the lesson overview worksheet that they had downloaded into their computers at the start of the lesson. He directed students to the headings and gave a brief summary and then moved to the skills list and assessment requirements.

During this time, Mick had loaded his prepared remix and he then visually focussed students upon key points of the remix, such as form, texture and automation. He then played his completed example to the class.

His experience with both the software and confidence with a facilitative pedagogy enabled him to adjust the delivery of the learning focus when complications arose.

Towards the end of the remix (3 minutes) the end of lesson bell rang and students began to politely pack up. To conclude the lesson, Mick told students to bring their notebooks to the next day's class and he would have the resource files on several USB memory sticks in both 08 and 09 Garage Band files.

The introduction to the second observed lesson (having had two lessons since the last observed lesson) demonstrated a different strategy. As students arrived, Mick directed them to continue with assembling their remix (allowing students work time) while he moved through the class listening to students using a twin headphone adaptor and providing feedback. The small class size (8) allowed him to personalise the feedback. The start to this lesson could be compared to a 'rolling-start' in a motor car race; the learning activity is set in motion before any formal commencement dialogue is provided by the teacher.

Mick: I thought that was very deliberate what you have done with the drum and bass. Where you are there, you should start the drum and bass stuff happening again…. (mix continues to play) that's a nice little break. That's a really good build up from the beginning. Is there anything that's not quite right about it?

Student: The vocals aren't synchronised with it?

Mick: Well, the vocal rhythm is alright but it's something else to do with how the melody sounds against the other instruments.

Student: Do you mean like harmony chords from the bass and keys?

Mick: Yeah, any idea how that can be fixed easily?

Student: No

Mick: Well think a bit harder 'cause it has something to do with your loops

Student: Do you mean like finding a different sound or shifting the pitch in some of the loops.

Mick: Well, some loops can be more major or minor sounding so choosing different loops might work but if we take a look at the chord chart in your resources and shift the loops to match the chord progression they will probably work better. You should ask (names another student) because they have been using region pitch shifting quite well. Later, we'll be listening to some of the remixes so I'll expect to hear some pitch shifts in yours so get moving and ask (names other student).

This leading questioning and directing the skill training to another student reinforced the emphasis upon students finding solutions and sharing knowledge and expertise.

The first whole class instruction occurred a third of the way into the lesson. Mick organised a student's notebook audio to be connected to the loudspeakers and had his own computer connected to the data projector.

Once he had everyone's attention, Mick pointed out the course overview on the data projector and then briefly summarised the focus of the remix project and what they had done in the previous three lessons to get to this point. He then scrolled to the assessment section and asked several students to read aloud a paragraph each.

> I want you to listen to (mentions students name) remix and I know it's only half finished, but I want you to recognise how many of these skills are used and work out what are the things you really like about the remix and also the things that you think

> could be better. We're then going to have a discussion and I reckon the cleverer answers should be able to support their comments with the names of the skills needed to do that.

The ensuing discussion highlighted to Mick that students were not identifying the skills he expected so he responded to this by revising the 'how to do' skills from the course overview. This required students to come out to the teacher's computer and working on a partly completed remix, demonstrate visually and verbally to each other how to do each skill step. The student closest to Mick commenced demonstrating the first two skills on the list and subsequently students came out in a clockwise order. Mick urged students to help and direct a student if they did not know how to do the skill and also urged students to suggest alternative ways of achieving the same skill.

With fifteen minutes remaining in the lesson and although not all skills were revised, students were directed to return their focus towards their own remixes. One student then asked how they could make their own loop from an existing song. Mick had anticipated that this may occur and proceeded to give a demonstration of the technique using the student's computer. This took approximately 10 minutes and Mick was later to reflect upon showing the student this step in the following way.

> When I think about it, I shouldn't have bothered talking about creating a loop from an existing song because it stuffed up the end of the lesson. At the same time if these kids are going to go away and use these tools and really explore its full extent , they'd spend hours and hours on it because it takes a bit of time to come up with something. So I suppose what I was thinking was these kids have got an interest in this sort of thing and if you let them know what is possible they might go out and start playing with it. So it was more, I just wanted to throw that one in there because I knew that (student name) was dead keen to get some of their music into it. I thought this is how you do it. (Another student name) seemed to be interested in that idea as well. I don't know about the others but it's a way that they can personalise it a bit more. Even if they didn't pick up on every little element of the skills or the steps that are required to do that, just alerting them or awakening them to the possibilities I think is one of the biggest things with this sort of technology.

This example highlights how Mick's values and beliefs lead him to provide more specific and deeper skill development for a select group of students but this was to come at the expense of the time available for lesson closure.

Mick realised the lesson was soon to conclude and asked students to stop their own work and have a listen to their neighbour's work. Soon after they had commenced listening the end of lesson bell rang and although most students listened until the end of the remix there was only limited discussion and feedback as students packed up and moved to their next lesson. Mick was speaking over the top of this that the next lesson would be their concluding class and they should expect to have some work ready to hand in.

Classroom Management: The small class size (8 students) allowed Mick to provide further time for individual feedback and close monitoring of student work habits. Mick made only minor reference to some off task behaviour with internal email's being the only concern.

Evaluation and Assessment:

No formal assessments took place during the two observed lessons. Informal individual and general class feedback was provided at regular intervals. It was rare for him not to be alongside a student solving technical issues or listening to and discussing student work.

Mick's course overview included some brief assessment information focussing upon:

1/ Skills and knowledge in using Garage Band

2/ Creativity in reproducing/rearranging the song.

> My initial plans for assessment were going to include a rubric and some percentage breakdown and I wanted to explore a structured peer assessment model as I don't usually do that but I ran out of time. I was planning on extending the brief criteria list given within the course overview but it just didn't happen. In fact the whole course ran out of time.

He indicated that he modified his assessment expectations during the final lesson and chose to listen to student's incomplete works in class using headphones. He applied the original criteria (listed above) clarifying their understandings by asking questions regarding why and how, and arrived at a score out of 20. This score formed part of their music semester grade and was combined with other aspects of their music course such as: music theory; analysis; composition and solo/group performance. He also provided the students the opportunity to improve this grade by submitting more complete work via email. One of the eight students chose to do this.

Reflection on the Designed Learning Experience:

Mick was disappointed and frustrated by the circumstances that lead to a reduced lesson time for students on this learning activity but he also acknowledged that the compromises were necessary due to curriculum prioritising and unavoidable school disruptions (fire-drill, school-cross country, year level excursions). Mick also noted that individual student absences also made it more difficult for students to progress as much of the learning of software specific technical skills and how these could be applied as musical techniques required the learner to be assisted through guided exploration by either himself or another student. Finding lesson time to do this was not always practical. Mick identified that he had provided a partly completed project to two students who had slipped behind the rest of the class due to absences and did provide additional coaching and hands-on help outside of class time.

Mick had anticipated that students would be enthusiastic about the learning activity and initially he believed they were. However, due to interruptions in the lesson sequence and student absences, the creative exploration and experimentation became a 'grind and hard work'. He was satisfied with his task design and delivery but believed the solution for future classes would be to block a series of lessons (two to three a week rather than once a week) to ensure continuity.

Second Lens: Checklist for Pedagogical Constructivist Depth

Mick had identified that constructivist learning philosophies had influenced his approach to pedagogy. The following checklist examples support this view while also suggesting that students would be more likely to adopt a deeper approach to learning through his approach to designing and delivering the remix learning experience.

Table 15: Mick's Checklist for Pedagogical Constructivist Depth

Teacher	Multiple perspectives	Student-directed goals	Teachers as coaches	Metacognition	Learner control	Authentic activities & contexts	Primary sources of data	Knowledge construction	Knowledge collaboration	Previous knowledge constructions	Problem solving	Consideration of errors	Exploration	Apprenticeship learning	Conceptual interrelatedness	Alternative Viewpoints	Scaffolding	Authentic assessment
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Mick	D	S	D	S	D	D	D	D	D	S	D	D	D	S	N	S	D	S

S = Surface Understanding D = Deep Understanding N = Not Represented

1. Multiple perspectives: The learning task encouraged students to represent the remix concepts in a wide variety of musical styles as well as from their own personal perspective. The selection of one common activity song (America's Sweetheart) could be regarded as restrictive, however, in this instance, a common component enabled diversity and creativity to become even more apparent. This was regarded as designing a deep approach to student learning as students could represent and demonstrate the musical concepts of a remix in a variety of personalised ways
2. Student-directed goals: The students negotiated some aspects of their goals and direction for their remix however; these goals and objectives were within a 'lightly-scaffolded' framework that had suggested expectations or requirements (see Appendix 23). This was regarded as pragmatic design approach, justifiable given the teaching time frame but more likely to lead to a surface approach to student learning.
3. Teachers as coaches: Much of Mick's teaching style focussed towards facilitation through directed questioning techniques, student led class demonstrations and skill development

delegation to other students. Some direct teaching was also evident. This was regarded as an indication of supporting a deep approach to learning.

4. Metacognition: Experimentation was a key component to the learning process and the task design allowed for students to describe verbally their thought processes during a mediated class discussion. There was no written reflection or self-analysis so this provided only one approach and was regarded as a surface approach to metacognition.
5. Learner control: Within this lightly scaffolded activity, students played a central role in directing and shaping their learning through deciding how they represented the key remix concepts within their work. This was regarded as providing students with a deep approach to building upon their previous musical understandings and control as to how these could be represented.
6. Authentic activities & contexts: Remixing existing songs is an accepted form of composition and arranging using digital audio and MIDI and the natural complexities of the genre were not minimised in any way. This was regarded as designing a deep approach to learning.
7. Primary sources of data: The task design used an existing song and framed the learning around authentic audio editing and rearranging skills used when creating remixes. Additional depth was added by demonstrating the process of creating audio loops rather than relying only on preformatted loops. The YouTube examples supported the authenticity of the task. This was regarded as offering students a deep approach to learning
8. Knowledge construction: Students and teacher demonstrated key competency skills then students constructed their understanding through applying these skills in self-directed ways within their remix. This was regarded as offering students a deep approach to knowledge construction.
9. Knowledge collaboration: The instructional design engaged students in establishing shared meanings for key concepts, skill development, and then directed students to work independently. Peer assistance was encouraged and directed by the teacher. Listening to other student's work and commenting encouraged discussion and knowledge collaboration and this was regarded as designing a deep approach to learning.
10. Previous knowledge constructions: Consideration was given in the task design to students possessing varying levels of musical understanding and audio editing experience. Students with deeper understandings were expected to demonstrate more sophisticated musical outcomes from the same learning activity. Although no formal method of checking these understandings was evident, class discussions and teacher/student feedback provided

some opportunity for interpreting the knowledge construction process. This was regarded as providing a surface approach to considering previous knowledge construction.

11. Problem solving: The learning activity design allowed students considerable opportunity to demonstrate musical problem solving as they independently assembled and blended their combination of edited audio loops. A range of textural complexities was possible allowing student's scope to demonstrate deeper understandings. This was regarded as providing a deep approach to learning.
12. Consideration of errors: The instructional design required students to self-regulate and identify errors such as rhythm inaccuracies and harmonic textural clashes during their experimentation and application of remix techniques. Peer and class listening, discussion and teacher feedback were all used to promote student reflection on successful and not so successful applications of remix techniques. This was regarded as providing a deep approach to learning.
13. Exploration: The instructional design encouraged students to independently experiment and explore combinations of musical styles through editing and arranging techniques. This was regarded as providing a deep approach to learning.
14. Apprenticeship learning: This instructional design did not follow a traditional master/apprenticeship design although some elements were evident. Mick rarely provided hands-on contribution, with regular advice and encouragement being Mick's preferred approach. His provision of a partly completed project for the students who needed additional help suggested a form of apprenticeship learning. The nature of the editing tasks were continually complex and gradual development of skills was not possible. This was regarded as a surface approach to learning.
15. Conceptual interrelatedness: Few links were directly made to other ways of representing the concept of a remix in other subject areas. This was regarded as not being represented.
16. Alternative Viewpoints: Collaboration and cooperation were not designed into the teaching activity. Students worked independently but were regularly involved in class and peer listening as well as class discussion. This was regarded as likely to lead to a surface approach to collaboration and alternative viewpoints.
17. Scaffolding: The activity design and resources were regarded as light scaffolding which allowed the students considerable freedom for exploring, experimenting and personalising their remixes while still directing them to work beyond the limits of their ability. This was regarded as a deep approach to learning.

18. Authentic assessment: The proposed assessment model was intended to have a summative emphasis and regular interwoven assessments were not scheduled. Formative procedural assessments were not intended although they were required due to time constraints. Students did not create a formal verbal or written reflection or self-evaluation. This was regarded as likely to lead towards a surface approach to student learning.

Research Question Summary

Micks' Pedagogical Considerations

Mick took particular care planning and preparing his remix topic, suggesting a deeper level of learning design. An important pedagogical decision was choosing to develop his own remix topic for the class. This required personal research, learning new skills and subsequently preparing a completed example that was intended to provide students with an exemplar of one possible approach. This process provided Mick with first-hand experience with what student learners were likely to encounter and assisted him with preparing his learning activity overview and skills lists. He chose not to develop a step-by-step skill development activity instead relying upon suggested skills lists and student and teacher show-and-do demonstrations. This enabled him to gauge prior student knowledge and understanding as well as tailor skill activities to individual's needs.

The observed lessons highlighted his ability to direct student learning through a range of teaching strategies that included; whole class instruction and demonstrations, individualised student work with roaming teacher assistance and feedback, facilitative support with 'just in time' skill development, procedural troubleshooting and providing software specific workarounds, peer teaching.

Mick identified his frustration at the remix course running out of lesson time due to curriculum prioritisation. He was disappointed that most students did not get a sense of completion to their learning experience and that the intended assessment structures were significantly modified, reducing their effectiveness for promoting learning and understanding.

Mick's Pedagogical Content Knowledge with regard to Music ICT

Mick's very competent understanding of ICT, as well as experience using and teaching Music ICT, provides several examples of pedagogy that may be unique to Music ICT.

An important theme that was evident in his planning and teaching was focussing student learning upon achieving musical outcomes using technology. Music was the focus, not the technology. Software specific hierarchical skill lists (placed in the likely order students would need to use the skills) and discussion examples were correlated to musical terms like style, texture, tonality, key, chords, melody, rhythm and balance. An emphasis was also placed upon students critically listening to each other's work and through a process of providing supportive comments and discussion; Mick believed this process provided students with additional inspiration and motivation.

His preparation of a completed exemplar, as well as a project template to 'kick-start' students' progress demonstrates pedagogical insight that he identified had come from having previously taught similar topics.

Two examples of his Music ICT expertise influencing and enhancing his pedagogy was his ability to: present a number of ways to achieve specific musical effects using a variety or combination of software specific process skills; apply problem solving strategies that required an understanding of computer systems, school network, as well as software procedures, enabling him to determine if perceived equipment failures were really student misunderstandings.

Mick's Constructivist Influenced Teaching Strategies

An analysis of Mick's teaching strategies identified that from the 18 categories contained within the constructivist checklist; the only category not represented within Mick's learning design was conceptual interrelatedness (category 15). Of the other 17 categories, twelve of these suggested a design likely to lead to a deep approach to learning by the students and five categories were regarded as likely to result in a surface approach to student learning. This finding indicates that Mick's overall approach to teaching using Music ICT was significantly influenced by constructivist influenced teaching strategies and that much of his learning design was focussed upon developing deeper student understanding.

3.6.2 Tina's Story

Tina and Her School Context

Tina has been teaching for more than 10 years and is aged in her forties. She works in a co-educational R-12 school in low-socio economic area. Tina teaches music from years 6 to 12 and also in other curriculum areas.

The facility in which she taught the Music ICT remix project was a general purpose library which was equipped with 8 networked PC computers with an 'on-board' audio card and 2 headphone connectors. There were no audio speakers, no MIDI capabilities or data projector; a temporary loan projector was available but not used.

Teaching Class: The observed class was a Year 9 music class (students 14-15 years of age) consisting of 9 boys and 10 girls.

Music ICT Remix Activity: Tina designed her class learning activities based upon the teaching resource – Music Creation Using Audacity.

First Lens Pedagogical Reasoning - Part A: Designing the Learning Experience

Comprehension of Remix Topic and Music ICT:

Tina considers that her teaching and learning influences include; 'learning intelligences' (multiple intelligences), constructivism, student centred inquiry, with an underpinning of Christian values and beliefs. She regards Music ICT as a vehicle to develop and promote musical skills and understanding. These skills should also be transferrable to other subject areas such as Media, Drama and English. She describes herself as competent with using ICT for such tasks as word processing and emailing but regards herself as being at a fundamental level with using Music ICT. She indicates that she has attended two Music ICT training sessions and recognises that the only experience she has had teaching with Music ICT is with the scoring notation program, Sibelius. She occasionally uses Sibelius for school related composing and arranging tasks.

Tina uses a laptop computer for much of her personal teaching preparation while also occasionally using it for administrative tasks like student roll and mark collating. She regularly prepares her own activity worksheets, tutorials and task sheets using Microsoft Word but never uses multi-media activities or PowerPoint style presentations. She occasionally has students submit work via email. Tina regularly uses rubrics for evaluation and assessment and always employs student peer-mentoring and student peer-assessment.

Transformation of Knowledge into a Teachable Form:

Course Preparation: Tina was very enthusiastic regarding the remix project and believed her students would have a high level of engagement. She read the provided teaching resources ‘Music Creation Using Audacity’ and decided that she would use these both for her own training and for those of her students. One of the appealing aspects was that this could be a whole class activity using an all-purpose computer laboratory requiring no additional costs for Music ICT equipment or software; this was not possible within her music classroom that only had 3 computers. Tina identified that she had spent 11 hours training herself using the activities but was still concerned with the limitations of her own understanding. She was comfortable with students progressing faster than herself and decided that she would have a practice run with a small group of students prior to having the whole class experience the activity.

> I trialled the first lesson/activity with three students working on their own and initial disinterest quickly changed to energetic involvement and a fast pace. Communication between the students also became focussed and IT related.

Encouraged by their enthusiasm, she decided to implement the activity and organised a weekly booking of the library computer facility.

Representation of Ideas: Tina recognised that she did not have the understanding of the technology nor the first-hand experience to present a variety of possibilities and alternative strategies for producing a remix, so she chose to stay with the prepared resources, drawing upon the viewpoints and experiences of the students to personalise and add meaning to the activity notes.

Instructional Selection: Tina recognised that the independent and self-directed approach contained within the activity structure was not her preferred way of designing student learning. She therefore chose a range of instructional strategies that promoted interdependent student centred enquiry. She explained it in this way.

> I aimed for the maximum learning of students by bringing in as many different approaches to the work as was possible. Students acted as teachers, learners and encouragers. Team work was a strong feature of the tasks. Repetition allowed as many students as possible to be engaged in a successful way. Students were able to increase their knowledge and understanding at their level of knowledge at a comfortable pace.

She employed a pedagogy approach from her English teaching experience which featured an initial 'Think-Pair-Share' discussion process (Lyman, 1981), requiring students to individually think about the following key questions:

- How could you use these adjustments from Activity 1 in a multi-media creation?;
- What did you find were the easy things about using the program?
- What are the more difficult things about using the program?

She then required students to pair with a partner and share their views and then join with another pair and share their views. This designed a social interaction that established several baselines for understanding the remix activities and their possible applications.

Adaptation: The provided resources were adapted by having additional hand written directions identifying resource locations on network servers placed onto the Activity 1 PDF pages, as well as several explanation comments that she regarded as important for the students (Appendix 35). Tina also chose to enhance the initial framing of the activity tasks rather than significantly adapt and modify the prepared material. This involved the reflective process of small group discussion and question framing discussed above. This indicates that Tina drew upon her values and beliefs to choose an approach to teaching that she believed would successfully engage student learning.

Lesson Plans: Tina created a timeline overview for the course (Appendix 36) and structured her initial two lessons in some detail so as to maximise initial success in engaging her group of students. She explained that it was at this point it became apparent that the provided assessment model built into the activities was not going to be appropriate, due to students being required to work in pairs rather than individually, so an alternative process and reflection driven model was employed. Tina said that on one occasion the activities were used as relief lesson tasks, supervised by an external teacher.

Tailoring: Tina did not further adjust the resource material for individuals. However, the division of the class into experience levels resulted in a differentiation of learning support; the beginner group received additional teacher and student tutor assistance.

First Lens Pedagogical Reasoning - Part B: Delivery of the Learning Experience

Instruction of Class:

The first and third lessons were observed out of a total of 5 class lessons.

For the first observed lesson, Tina had prepared the library space prior to the students arriving and when they entered, they were directed to sit away from the computers. She briefly explained the learning activity and commenced the learning unit using an inquiry approach: 'establishing what you know and what you would like to know about remixes.' At this point, she handed out her enhanced instructions which had been adapted to suit the library computer configurations, in addition to the activity one notes. She facilitated and directed the initial discussions for approximately 15 minutes using the 'think-pair-share' model (Lyman, 1981), as well as whole class discussion. Following the discussions, Tina explained orally how the students were to use the PDF resource notes and reiterated the location of all the resources that were contained on her enhanced instruction notes. She then directed the class to divide into three groups; 'beginner, know a little, know a lot'. Tina actively promoted student sharing and discussion of tasks through pairing similar level ability students together and in a similar location. She directed a student to distribute the headphones and audio splitters and encouraged students to begin progressing through the first activity.

Tina made considerable use of verbal instructions as there was no whiteboard to write organisational directions or learning expectations. This made it difficult during the lesson for efficiently delivering the saving work instructions or reminding students of their homework expectations as they could not visually see a model of how to download the software and resources to their flash drives. It was also noted that audio representations of a remix, signal processes or editing techniques could not be heard by the whole class thereby reduced teaching efficiency.

Tina nominated student 'coaches' to support the 'beginner' and 'know a little' groups and although she regarded this as important pedagogically and practically, she was later to raise concerns.

> I like to use student coaches in all my teaching because I honestly believe it helps the advanced students understand better by getting them to think from a different perspective. My big concern is how to still keep student coaches, the advanced ones, progressing through the activity when nearly all of their time is occupied coaching other students.

Tina observed her student coaches and offered advice to them about coaching styles. One of her suggestions was to not take the mouse out of the other student's hands but to direct them using their voices. Another suggestion involved questioning techniques and helping the student find the solution rather than just showing them. Tina modelled this approach with the assistance she provided students; regularly directing students to other more competent students who were successful with implementing a skill or editing technique.

Students continued to work through the activity for the remainder of the lesson (approximately 20 minutes) with few whole class interventions from Tina. At the conclusion of the lesson, Tina chose to have a 5 minute debrief period to clarify what students understood from that lesson. She used a direct questioning technique and focussed upon the intention and process of developing audio editing skills and applying these to a remix.

In the second observed lesson, an initial 15 minutes was devoted to small group discussion. The students began by summarising their understanding of what they had been doing, as well as identifying skills they were developing from the previous two lessons, using the 'think-pair-share' model discussed earlier. The class cohort seemed familiar with this structure and readily participated in offering their views and opinions.

Of interest was how Tina noticed how she changed her teaching style during the sequence of lessons.

> I talked less to the whole group as lessons progressed and gave more responsibility to individuals who could lead others. The use of computers was increased … and I helped individuals and supported each groups' progress.

This was evident during the second observation as longer periods went by without Tina asking the class for their attention. Tina believed this was due to the students becoming more familiar with the workflow structure as well as making visible (and audible) progress through the activities.

The peer mentoring models that Tina had established had resulted in demonstrated leadership by several students and Tina commented that:

> The student tutors did a great job so I was quite pleased with the way all of the students responded. It was clear there was a high level of engagement but I did notice that the activity progress slowed considerably and less reference was made to the activity sheets once the student tutors had demonstrated or coached, as they then tended to rely on their fellow student's for continual guidance rather than the activity notes.

The conclusion of the lesson was somewhat rushed and the planned debrief did not occur as another teacher arrived with their class to use the library computer facilities. Verbal instructions regarding the pack up and a reminder of continuing on homework were issued but it was unclear how much attention was being paid to these requests.

Classroom Management: Tina was very much directing the learning experience; directing students to activities and regaining their attention when she wanted to focus on a whole class activity. She walked and talked, coaching the learners as she went. There were very few reminders to students to return to their learning tasks with Tina identifying that on average 2 minutes each lesson was spent encouraging and directing positive student behaviour. She reported a high level of student engagement with very little 'off task' student behaviour disrupting learning and the two observations supported this view.

Evaluation and Assessment:

No formative or summative assessment occurred during the observed lessons although Tina regularly gave students feedback and offered suggestions. Tina commented in her final interview and questionnaire that she chose to evaluate student learning on an informal basis rather than using the MCUA rubric and self-reflection.

> Evaluation during lessons has occurred informally; this happened through conversations, viewing students' work, listening to and suggesting improvements to the sound and checking progress within lessons. I didn't think we would have the time to teach the students how to use the provided rubric or self-assessment model.

Her assessment model was explained to include their ability to: orally summarise their own learning through individual and small group discussion of what they found easy or difficult; to discuss and demonstrate a particular skill and technique within the activity that they were working upon; to identify and discuss the transferability of the skills to other learning areas (subjects). There was no submitted written aspect to the reflection process.

Reflection on the Designed Learning Experience:

Tina claimed in interviews and questionnaires that she routinely reflected upon how her own teaching processes and considered how the lesson design could be improved, so as to better support student learning. She considered the remix learning experience was successful for many students and was pleased with the progress and application of the students. She stated that:

> The reasons for doing this topic is not about me being confident or competent with the activity but about where the students can take these skills and apply it to not just music

> but other areas of their learning. I see myself as a facilitator and that students learn better when they collaborate…. I don't teach to the middle of the class, so we have to work in collaboration with each other to continue to develop our learning. I like the way students explore skills and adjust parameters away from the notes but that means students don't get as far along as I had originally hoped, but in this activity I don't mind that trade-off.

This suggests that Tina regards providing opportunities for students to develop a greater depth of understanding through giving more exploration time is more important in this Music ICT learning experience than content coverage. Other points of concern for Tina were the technical limitations of conducting the class in a library environment, resulting in limited audio support, difficulties saving student work, which hindered cumulative and progressive student work, as well as the modified assessment model.

Second Lens: Checklist for Pedagogical Constructivist Depth

Tina had indicated that constructivist learning philosophies had influenced her approach to designing learning and teaching. It is apparent from the following analyses that she drew upon many student centred teaching practices.

Table 16: Tina's Checklist for Pedagogical Constructivist Depth

Teacher	Multiple perspectives	Student-directed goals	Teachers as coaches	Metacognition	Learner control	Authentic activities & contexts	Primary sources of data	Knowledge construction	Knowledge collaboration	Previous knowledge constructions	Problem solving	Consideration of errors	Exploration	Apprenticeship learning	Conceptual interrelatedness	Alternative Viewpoints	Scaffolding	Authentic assessment
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Tina	D	N	D	D	S	S	S	D	D	D	N	D	S	S	D	D	D	S

S = Surface Understanding D = Deep Understanding N = Not Represented

1. Multiple perspectives:
   The provided resources demonstrated specific skills and techniques in a limited number of ways. Tina designed multiple representations of skills and concepts through group discussion and peer assistance and publically acknowledging student's creative extension or personalisation of activity steps. This was regarded as designing a deep approach to student learning.
2. Student-directed goals:
   There was an intention that students would reach a concluding self-directed activity. However, due to time limitations, this did not occur within this lesson sequence. This was regarded as not being represented.
3. Teachers as coaches:
   A facilitator role was evident throughout, with whole class and small group discussions. Coaching occurred despite her own acknowledged inexperience with the software through designed questioning rather than 'show and tell' demonstrations. This indicated a deep approach to supporting student learning

4. Metacognition:
   This was mostly accommodated through directed small group discussions by students, as well as lesson summarisation and reflection on prior lesson learning. This indicated a deep approach to promoting thinking about learning
5. Learner control:
   As the worked examples had a pre-determined learning sequence, students had limited choice as to the content. Some directed exploration within a guided framework was encouraged (self-selected editing values). Students working in pairs required further negotiation and compromise. This was regarded as a surface approach to learner control.
6. Authentic activities & contexts:
   The instructional activities provided authentic editing tasks using authentic tools within an extended worked example. As students did not apply these skills to a free choice song, this was regarded as likely to lead to a surface approach to student learning.
7. Primary sources of data:
   Initially, the worked examples restricted the available audio resources. However, the concluding extension activity provided free choice selection of the remix song. No students reached this point. This was regarded as likely to lead to a surface approach to learning as students were provided with primary source data.
8. Knowledge construction:
   The teaching pedagogy emphasised constructing understanding through discussion, collaboration and discovery rather than only reproducing knowledge (specific audio editing skills) as required by the structured activities. This teaching approach was regarded as a likely to lead to a deep approach to student learning.
9. Knowledge collaboration:
   Students working in pairs and regular small group and whole class discussions allowed considerable opportunity for social negotiation of the skills, applications and meanings of the term ‘remix’. This was regarded as designing a deep approach to student learning.
10. Previous knowledge constructions:
    Initial student discussion and subsequent small group and whole class discussion allowed students the opportunity to reflect upon their previous understanding of what a remix is and consider how their understandings were being modified by their learning experience. Course planning demonstrated consideration of prior audio editing skills and remix knowledge in the selection process of peer mentors. This was regarded as likely to lead to a deep approach to student learning.

11. Problem solving:
    The instructional resources initially contained no problem solving opportunities other than experimentation with skills. The concluding extension activity did provide considerable scope for problem solving and higher order thinking skills. However, no student reached this level. This was regarded as not being represented.
12. Consideration of errors:
    Errors and instructional misunderstanding were supported through peer assistance of paired learning groups and a student assistant or teacher checking the developing worked examples. This was regarded as designing a deep approach to student learning.
13. Exploration:
    Exploration was encouraged within specific controlled parameters e.g. adjusting the values for editors to produce a longer or shorter delay or a variety of repetitions or pan positions. The activity encouraged and rewarded students for following the prescribed learning pathway (they progressed) and open exploration of other components of audio editing was not supported. This was regarded as providing a surface approach to student learning.
14. Apprenticeship learning:
    Student mentors performed the role of knowledgeable other for less advanced students. Tina acknowledged that she was not advanced enough in her own understanding of the concepts and software to support this type of teaching approach. This was considered likely to lead to a surface approach to student learning as modelling of techniques and understanding were restricted by inexperienced mentors.
15. Conceptual interrelatedness:
    Tina regularly required students to reflect upon how a technical skill or remix concept could be used in other subject areas (Science, Media and English). This was regarded as likely to lead to a deep approach to student learning.
16. Alternative Viewpoints:
    This was accommodated through short written reflections, whole class and small group discussions regarding where and why the effects processes and skills could be used. This was regarded as designing a deep approach to student understanding.
17. Scaffolding:
    Tina recognised the heavy scaffolding incorporated within the learning activity and chose to use aspects of this within her pedagogy. She chose to retain the skill development component but embellished and extended the conceptual introduction portion, while excluding the provided assessment process. This was regarded as designing deeper learning opportunities through supporting students to achieve a higher level of understanding and skill development while integrating a heavily scaffolded learning activity.

18. Authentic assessment:

    Only an oral discussion of conceptual understanding, as well as observed practise, was used to determine student understanding and their level of achievement. An evidence based approach using a criteria rubric and a completed audio example was not employed. This was regarded as likely to lead to a surface approach to evaluating and assessing student learning.

Research Question Summary

Tina's Pedagogical Considerations

As an experienced student centred educator with very little Music ICT specialisation, Tina's story provides an insight into the considerations required for designing and creating a learning experience that is not driven by subject content knowledge but focussed upon students learning through designed pedagogical expertise. One of the important pedagogical decisions that Tina made was not to try to teach this remix topic like a Music ICT specialist; modelling and troubleshooting software skills. She came to this decision after experiencing only limited personal success working with the Music Creation Using Audacity resources, but was encouraged by student response to a trial she ran with them using the resources. She chose to employ a facilitative pedagogy approach that she had successfully applied in her other subject teaching areas. These strategies included: group topic discussion using a 'think-pair-share' strategy (Lyman, 1981); student led peer mentoring; learning reflection time, in which students verbally summarised to each other what they wanted to learn or had learned and how these skills could be applied to their musical interests.

Tina used the guided learning activities contained within Music Creation Using Audacity as the learning content but replaced the individualised sequential learning model suggested by the resources with an approach that enhanced and emphasised a social and peer mentoring approach. This resulted in Tina coaching student mentors with 'teaching strategies' to guide their peers through the learning activity steps.

Tina considered the learning activity was successful but considered the limitations with the learning environment (computer network not saving student work correctly, students sharing computers, and a library location that had no audio sound or data projection) hampered student progress. The proposed assessment model contained within the MCUA resources was replaced by a more informal observation and discussion approach that reflected an emphasis upon concept learning and personal application rather than measuring skill techniques and evidence of musical learning outcomes.

Tina's Pedagogical Content Knowledge with regard to Music ICT

Tina felt that her lack of experience using Music ICT, as well as inexperience with teaching using Music ICT, had made developing this remix topic a pedagogical challenge. She considered that specialised content knowledge concerning musical applications of software skills as well as technical 'know-how' regarding computer and network structures would have changed the way she taught this topic. She regarded this remix project as both a learning opportunity for the students and herself and believed that she would teach this topic differently next time, following this experience.

Tina's Constructivist Influenced Teaching Strategies

The analysis of Tina's teaching and learning design strategies revealed that from the 18 categories contained within the constructivist checklist there were only two categories that were not represented, student goals (category 2) and problem solving (category 11). Of the other 16 categories, ten of these suggested a design likely to lead to a deep approach to learning by the students and six categories were regarded as likely to result in a surface approach to student learning. This finding indicates that Tina's overall approach to teaching using Music ICT significantly displayed constructivist influenced teaching strategies and that much of her learning design is focussed upon developing deeper student understanding.

3.6.3 Rebecca's Story

Rebecca and Her School Context

Rebecca has been teaching for more than 5 years and is aged in her twenties. She works in a co-educational R-12 school in low-socio economic area. She teaches classroom music for years 8 to 11 and is involved in a range of co-curricular music ensembles.

The facility in which she taught her Music ICT remix project was a dual purpose equipped room with 12 networked PC computers arranged in 3 forward facing rows. Each used an on-board sound card with no MIDI capabilities. Mirroring this was an assortment of electronic keyboards similarly configured in forward facing rows. The teacher's desk had a controller workstation that was connected to a mounted data projector and a multi-purpose audio system with mounted speakers.

<u>Teaching Class:</u> The observed class was a Year 10 music class (students 15-16 years of age) consisting of 23 students (13 girls and 10 boys).

<u>Music ICT Remix Activity:</u> Rebecca designed her class learning activities based upon the teaching resource – Music Creation Using Audacity.

First Lens Pedagogical Reasoning - Part A: Designing the Learning Experience

Comprehension of Remix Topic and Music ICT:
Rebecca was uncertain how to describe the learning and teaching theories that influenced her classroom music teaching.

> I don't give it a lot of thought really as I generally follow the structures at the schools I've taught at. I'm pretty comfortable with developing course and lesson plans from a curriculum and I like to give students the opportunity for self-direction and choice but I like to be pretty much in control of what happens in the classroom and generally we've got a lot of content to get through.

She regarded Music ICT as important for her classes as it helped them explore and extend their creativity while also reinforcing aural and theory content. The Music ICT tools she valued most include: Sibelius and Audacity.

She had attended some ICT training sessions and describes herself as competent with using both ICT and Music ICT. Rebecca commented that she regularly uses Music ICT for school related composing and arranging tasks but never outside of school for personal composing. She uses a desktop computer for much of her personal teaching preparation, in addition to using it for administrative tasks like student roll and mark collating. Rebecca regularly prepares her own activity worksheets, tutorials and task sheets and occasionally uses multi-media presentation modes but chooses not to use PowerPoint style presentations. Her school does not support email submission of student work but does provide network folders for students to submit work to teachers. She said that she occasionally uses rubrics for evaluation and assessment and occasionally employs student peer-assessment. Rebecca did not intentionally design student peer-mentoring as a teaching strategy but regarded it as a natural consequence of student interaction in classrooms.

Transformation of Knowledge into a Teachable Form:

<u>Course Preparation:</u> Rebecca began planning for teaching the remix unit by analysing the Music Creation Using Audacity resources. She planned that this topic would fulfil their third term technology component within her school's year 10 music curriculum.   She initially considered the first three activities were achievable for the whole class and was optimistic that some students would be inspired to work independently and progress to the concluding remix activity. She summarised her expectations as follows

> It's likely to be more about remix skills rather than everyone completing a remix …. the six lessons won't really give them enough time unless they go home and work at it.

She identified that she had spent four hours preparing the remix unit as she wanted to "understand first-hand how it all worked". This involved both personal development time working through activities one and two, in addition to working with the school's computer technician to upload the software and resources to a location that students could access and save their work.

<u>Representation of Ideas:</u> Rebecca chose to use the conceptual structure contained within the Music Creation using Audacity resources and initially thought that she would not enhance or embellish any of the explanations.

<u>Instructional Selection:</u> Rebecca identified that her preferred way of teaching with Music ICT was to follow a structured activity that was supported by activity worksheets and teacher direction and explanation.

> I've inherited some really good worksheets for Fruity Loops and Sonar that my year 8 and 9 classes have done and because the directions are really clear we get some really good student work. I find if I stray too much from the script some of our students tend to get lost and confused so I've tended to keep to the plan. The Audacity stuff (MCUA) is similar so it should work well with my 10's.

She created A5 printed booklets of the MCUA PDF activities and students referred to these rather than using the on-screen PDF's.

<u>Adaptation:</u> She chose not to adapt or modify the Music Creation Using Audacity resources and allowed the learning sequence designed within the activity to guide the students.

<u>Lesson Plans:</u> She had planned for twice weekly lessons for a block of six weeks but no course overview or individual lesson plans were formally created and lesson content and learning sequence came from the pre-designed activity resources. Of interest was that Rebecca decided to divide the class along gender lines so as to allow students to work individually on the 12 computers rather than in pairs. (Although there were 13 girls in the class, Rebecca said due to student absences only once did students share a computer.) This dual activity lesson required students who were not working on the computers to continue with self-directed instrumental practice to prepare for a small group and solo performance assessment. She explained that this dual activity approach was regularly used with music theory lessons.

<u>Tailoring:</u> Rebecca explained that there were several students in the class with learning and behaviour difficulties and, although the curriculum activities would not be modified, she was planning to support their learning through additional monitoring and direct teacher assistance.

First Lens Pedagogical Reasoning - Part B: Delivery of the Learning Experience

Instruction of Class:

The researcher observed the fourth lesson which was the boys second remix lesson and the eighth lesson which was the girls fourth remix lesson. Each lesson was 50 minutes long. (Due to illness and prioritising of activities only eight lessons occurred). Both observed lessons were similar in pedagogy style and sequence so they are discussed together.

Lessons began with an established school structure of students standing behind their desks awaiting a formal welcome from the teacher. In the first observed lesson boys were directed to the computers and girls to the keyboard half of the room. A roll was taken and Rebecca then explained that the boys would be continuing with the Audacity remix and that the girls would be having self-directed practical time to prepare for their instrumental assessments. These instructions were reversed for the second observed class. Prior to students arriving, Rebecca had assembled the headphones and activity booklets and directed students to distribute these.

In each observed lesson, Rebecca followed a pattern of teacher demonstration followed by student practise and application. This process was repeated three times, each cycle consisting of 3-5 minutes teacher demonstration and 10-15 minutes student application time.

During the demonstration stage she regularly referred to each process step from the activities booklet and would check through direct questioning and room scanning that she had the classes' attention. At the conclusion of her demonstration she would restate her expectations for where students should be in 10 -15 minutes time. During the first observed lesson the audio did not work on the teacher computer however, she continued 'unfazed' and occasionally used her voice to mimic what should have been audible. This provided some comic relief for her class. This audio problem was fixed in the second observed lesson but of interest was that her pedagogy approach did not change. The following example from the second observation typifies the teacher controlled direction.

Rebecca: As I said earlier we're looking at half way through Activity 2 now, 3F, it's on page 9. can you all turn to page 9 now… we're looking at 3 F.

Student A: What if I'm past that bit?

Rebecca: Well that's very good, but just repeat this step with me in case you've skipped something. .. Once I've got everyone's focus we'll start… (Rebecca walked around the room and helped a few students get to the activity starting point) Now there's an explanation before step 1 that tells us all about what a stutter is. (Student Name), can you read it out aloud please?

Student B: (Reads section with some pronunciation help from Rebecca)

Rebecca: Thanks (Student name). So watch my steps and then you repeat it. Step 1 says to enlarge the track titled 'Once'. So we make sure we have the selection tool and on the lower edge of the track hover until a resize arrow appears and click and hold the click while you drag downward and as you can see it enlarges the track so that we can see the waveform image better. Just make it about double

> it's original size. Now move the selection pointer to the edit toolbar which is up here and click on the Zoom in tool that looks like a magnifying glass with a plus sign. Click on it several times to make it spread a bit more, if you go a bit too far click on the zoom out tool like so. So everyone do that step 1 right now. (Rebecca walks around the room for 30 seconds checking and directing that this step has been followed). Now eyes back here please. Step 2 wants us to …..

This demonstration style went on for the next 7 minutes until the end of step 10, generally with two steps being combined and occasionally 3. Rebecca then directed the students that they had 15 minutes to get to the end of 4A on page 11.

During the student work time, Rebecca roamed and scanned student progress, assisting and explaining when required, solving computer issues and generally encouraged students to progress to the designated level before the next demonstration. When she deemed intervention was required, she either chose to verbally direct the student with their mouse movements or physically demonstrated the process by holding the mouse. When asked about this she commented:

> I often grab the mouse as a first instinct and I know I shouldn't as it's probably better for the students to learn the mouse movements but I reckon it gives me a bit more confidence when I'm explaining so it's a funny sort of challenge for me- to touch or not to touch.

Rebecca regularly left the class to monitor how the 'other-half' of the class were progressing with their self-directed instrumental practice. Rebecca explained this process as follows:

> The kids are really used to having multiple activities going on and as we don't have enough practice room space or computers we often divide up the class; even when we do theory and history stuff and generally the kids are pretty good at staying on task but it's always worth checking.

During this work time the students working on remix skills would frequently interact with either questions to each other or requesting that 'they had to listen to this'. This informal approach to providing peer mentoring and peer listening did not go unnoticed by Rebecca and she commented that:

> I haven't really encouraged the students to listen to each other's work or help each other but they seem to do it themselves and as it seems to help keep them interested

> and provided it doesn't get out of hand, I'm comfortable with it taking place, particularly when I'm out of the room.

Large portions of the lessons were mostly silent as students worked independently. During this time Rebecca provided feedback to students in an informal, personal manner and generally guided students towards verbal reflection.

> Rebecca: What do you think you've done well?
>
> Student: Edited the words cleanly and rearranged it a bit
>
> Rebecca: Yeah, I agree, but do you think you could do a bit more with the re-ordering?
>
> Student: I could but I reckon I've got the hang of it so I really just want to catch up with the rest of the class.
>
> Rebecca: Well show me how 'you've got the hang of it' and talk me through the process and then you probably will be ready for the next steps.

This exchange was typical of her strategy to encourage student on-task progress during the student work time. During one of her interview reflections she expressed the following view:

> I think it's important for a teacher to regularly listen to and comment on student work and with this audio stuff, that's no different. I try to provide some guidance and support to start with through my demonstrations but from then on I hardly have time to check and correct any misunderstandings. Keeping them together at similar levels makes it easier to teach and probably helps the majority of the students but there are probably some who should move ahead but don't.

Both lessons concluded with a 'two minute' warning to save their work, log-off and pack up their headphones. A similar warning was given to the instrumental practice students. A formal closure to the lesson occurred with students standing behind their desks with Rebecca reminding students of coming concerts, assessments and encouraging them to spend some home time on the Remix skills.

<u>Classroom Management:</u> Rebecca closely monitored student behaviour and was quick to intervene when she deemed students were not on task. During the observed lessons it was evident that she spent more time closely supporting the boys than was required with the 'girls only' group. Rebecca commented:

> I discovered that the girls paid greater attention to creativity and the completion of set tasks and following the instructions. The boys within this class, and I've noticed it in some of my other classes, generally skip a lot of instruction steps and then got lost. I think they're all motivated and want to learn new things but for many of the boys they don't naturally follow the plan and to get any sort of finished product. I have to keep them on track.

Technical issues with computers were identified as a challenge with computers freezing and some audio and headphones being intermittent and this added an unnecessary layer of complexity to managing the class learning activity.

Evaluation and Assessment:

Rebecca had originally planned to use the assessment structure contained within the activity resources, however, these plans were altered and significantly modified due to time constraints.

> We didn't get anywhere near as far through the unit as I had hoped and I didn't even attempt to explain the assessment tasks to the kids so my assessment is really only based on how focussed the students were during class, what I heard of their work and the explanations they gave to me during any help I provided them with.

Rebecca believed only three students had spent time on the remix activity outside of scheduled classes and although she was hoping for a much higher uptake she thought the set-up process on their own computer probably discouraged many from practising and completing these skills at home.

Reflection on the Designed Learning Experience:

At the conclusion of this remix activity; Rebecca was disappointed that due to school circumstances (curriculum pressures and her own absences) this unit of work had received a significantly shortened lesson allocation than she had planned. She summarised the designed music learning experience as follows:

> I don't think the unit of work was successful for the students because they never really got to apply the audio editing skills to their own interests. I'm realistic about the reasons why they couldn't get there but still I'm pretty happy with the way I taught the unit. … next year, I think I'll adjust the activities so that they are shorter and get the students to work on their own sounds quicker.

Second Lens: Checklist for Pedagogical Constructivist Depth

Rebecca indicated that within her teaching and learning influences, she valued providing students with the opportunity for self-direction and choice while as a teacher she wanted to retain control of what happens in the classroom. It is therefore not surprising that the constructivist checklist indicators suggest that the demonstrated pedagogy for this Music ICT remix learning experience was unlikely to lead to students adopting a deep approach to student learning.

Table 17: Susan's Checklist for Pedagogical Constructivist Depth

Teacher	Multiple perspectives	Student-directed goals	Teachers as coaches	Metacognition	Learner control	Authentic activities & contexts	Primary sources of data	Knowledge construction	Knowledge collaboration	Previous knowledge constructions	Problem solving	Consideration of errors	Exploration	Apprenticeship learning	Conceptual interrelatedness	Alternative Viewpoints	Scaffolding	Authentic assessment
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Rebecca	N	N	S	S	N	S	S	S	N	N	N	S	S	N	N	N	S	S

S = Surface Understanding D = Deep Understanding N = Not Represented

1. **Multiple perspectives:**
   The task design sequence guided students through a selected series of skill development activities that did not accommodate multiple perspectives or representations of audio editing concepts. This was regarded as not being represented.
2. **Student-directed goals:**
   Goals and objectives were set by the teacher not the student and therefore regarded as not being represented.
3. **Teachers as coaches:**
   Rebecca taught the class group through whole class demonstration of the activity steps then provided direct assistance with solving technical or procedural issues as she roamed the class. This was regarded as likely to lead towards a surface approach to student learning as the teaching style was more prescriptive and supporting of procedure rather than guiding and facilitating.

4. Metacognition:
   Due to a modified activity structure the intended self-reflection process contained within the assessment activity did not occur. Some teacher directed questioning of individual students supported student reflection on what they were doing in the editing steps. There was no observed or written evidence that class discussions had taken place with regard to the learning activity. This was regarded as likely to lead towards a surface approach to student learning.
5. Learner control:
   The observed pedagogy allowed limited experimentation within the activity framework; since all steps were regulated and initiated by the teacher. Teacher control was more noticeable than learner initiated control. This was regarded as not being represented.
6. Authentic activities & contexts:
   The instructional activities provided authentic editing tasks using authentic tools within an extended worked example that led to the skills being applied within a free choice song. As students did not apply these skills to a free choice song, this was regarded as providing a surface approach to student learning as students did not move beyond the training example.
7. Primary sources of data:
   Provided data audio recordings were provided for the two guided activities that were attempted during the remix activity. As students were unable to record their own voice and did not move outside the provided example, this was regarded as likely to lead towards a surface approach to student learning as moving beyond the training example was not emphasised.
8. Knowledge construction:
   The instructional design resulted in students reproducing knowledge (specific audio editing skills) through directed activities rather than constructing knowledge from a more general ‘discovery’ and reflection approach. Some experimentation was encouraged by the task design but this was regarded as likely to lead towards a surface approach to student learning as moving beyond the training example was not emphasised.
9. Knowledge collaboration:
   The pedagogy and instructional design directed students to work independently and therefore student interaction occurred either incidentally when students felt like playing their examples to each other or when they were seeking assistance regarding technical matters. This was regarded as not represented.

10. Previous knowledge constructions:
    No considerations of prior student use of audio editing programs or skills were evident within the lesson planning or delivery. This was regarded as not being represented.
11. Problem solving:
    The instructional resources initially contained no problem solving opportunities other than experimentation with skills. The concluding extension activity did provide considerable scope for problem solving and higher order thinking skills. However, Rebecca indicated that no student reached this level. This was therefore regarded as not represented.
12. Consideration of errors:
    The lesson activities focussed upon applied skill development and teacher feedback to students regarding misconceptions could occur during individual discussions. Rebecca identified that students would often get friends to listen to their work but it is unlikely this focussed upon consideration of errors. This was regarded as designing a surface approach to learning through consideration of errors.
13. Exploration:
    Exploration was encouraged within specific controlled parameters e.g. adjusting the values for editors to produce a longer or shorter delay or a variety of repetitions or pan positions. The activity encouraged and rewarded students for following the prescribed learning pathway (they progressed) and open exploration of other components of audio editing was not supported. This was regarded as designing a surface approach to learning through self-directed exploration.
14. Apprenticeship learning:
    This was not supported in the traditional understanding of master/apprentice modelling. The instructional activities gradually increased in complexity but the scaffolding support remained constantly explicit. The concluding free choice remix activity was intended to allow minimal scaffolding. However, Rebecca explained that no student reached this level. This was regarded as not being represented.
15. Conceptual interrelatedness:
    No direct link was made to other applications or uses for these skills in other subject areas so this was regarded as not represented.
16. Alternative Viewpoints:
    Consideration for how to apply the audio editing skills in other ways was not considered through the resource materials or through the instruction. This was regarded as not represented.

17. Scaffolding:
    The instructional resources were heavily scaffolded and Rebecca encouraged students to stay close to the resource steps so as students '.... wouldn't get lost'. Students never progressed to the lighter scaffolding of the final remix activity and therefore this was likely to lead towards a surface approach to student learning.
18. Authentic assessment:
    The assessment model was modified during the lesson sequence and within this modified model students were not required to provide reflection or a measurement on their learning. This was regarded as likely to lead towards surface approach to student learning.

Research Question Summary

Rebecca's Pedagogical Considerations

Rebecca described the remix activity as an opportunity for her year 10 music class to develop technical skills in audio editing and that students were unlikely to apply these skills to a self-choice remix as there was insufficient in-class lesson time. This belief regarding the curriculum purpose and limitations for this activity seemed to influence much of Rebecca's approach to the learning expectations she had for her class. Her pedagogy reflected a sequential, process driven approach that made the learning intention more about completing the steps in a competent manner as compared to building musical understanding using Music ICT.

Rebecca's preparation for teaching the remix learning activity included personally working through MCUA activities one and two, working with the school ICT technician to install and test the software and resources as well as print and photocopy the first three MCUA activities into an A5 booklet. She decided not to modify or supplement any additional lesson plans or assessment details for the students and used the MCUA resources as learning and explanation material

The facility in which Rebecca was teaching the remix unit contained twelve music computer workstations and 23 year 10 students. She decided to divide the class along gender lines and scheduled 12 lessons, so that both girls and boys groups had 6 in-class lessons working individually on the remix project and the other 6 lessons were spent preparing for a small group and solo performance assessment. This required Rebecca to supervise and move between the two groups located in different spaces within a suite of music rooms.

The two observed lessons demonstrated a pedagogy that included a series of 3-5 minute teacher directed whole class 'activity-procedure' demonstrations followed by 10-15 minutes of individual student application time. During this 10-15 minute period, Rebecca would move between the two class groups, as well as assist students who had procedural questions. The remix class worked mostly in silence with the only peer assistance and peer listening occurring, when Rebecca left the class to check on the other student group. When working one-on-one with students, Rebecca chose to use a positive questioning style that asked students to describe and explain what they were doing well and to demonstrate this in a practical competency-style assessment.

A modified assessment model was required due to the boys and girls groups only having 4 lessons rather than the intended six due to curriculum priorities caused through personal illness. This resulted in much of the self-reflection, submitting of student work and peer listening being cut from the remix activity. This had a significant influence upon the likely depth of learning experience available to the students.

In her personal reflection, Rebecca did not think the remix activity was successful for the students because the students didn't get to apply the audio editing to their own interests. Although she was satisfied with her own teaching approach, she identified that 'next-time' she would "adjust the activities to be shorter and get students to work on their own sounds quicker."

Rebecca's Pedagogical Content Knowledge with regard to Music ICT

Despite Rebecca describing herself as confident and competent with using ICT and having also previously taught Music ICT using a variety of other software programs, the displayed pedagogy suggested limited examples that demonstrated specialised Music ICT content knowledge. Her presentational approach followed the MCUA activity script and the questions directed to students expected them to demonstrate verbatim the suggested MCUA activity solution. One possible exception was her preparation step of trialling the software and resources on the school network computers prior to commencing the remix project.

Rebecca's Constructivist Influenced Teaching Strategies

The analysis of Rebecca's teaching and learning design strategies revealed that from the 18 categories contained within the constructivist checklist there were nine categories that were not represented. Of the other 9 categories, they were regarded as likely to result in a surface approach to student learning. This finding indicates that Rebecca's overall approach to teaching using Music ICT during this topic did not demonstrate a significant use of constructivist influenced teaching strategies. This suggests that her learning design for this activity was focussed upon completing prescribed skill steps that were likely to lead to a surface understanding rather than forming deeper connections to student's prior knowledge or their personal and social understanding of useful applications for Music ICT techniques. Rebecca's learning design needed more lesson time to move beyond the training examples. However, without group discussion, interaction, collaboration, peer- listening as well as personal and group reflection, it is unlikely that significant further depth would be added to student understanding.

3.6.4 The Teachers Who Adapted Instructional Resources

School Context

The four teachers comprising this group are Michelle, Brenton, John and Trevor. Details regarding their teaching experience and school contexts are contained within section 3.5.2. Of note is that John is the only teacher within this group not in his forties or older and was the only one not working within a purpose equipped computer music workstation environment. Each of these teachers chose to adapt the provided activity resources Music Creation Using Audacity for their remix learning activity. The reasons for this included: professional development for themselves; different approach to what they were used to; they believed students would enjoy the learning and be motivated by the activities resources; resources were easy to follow and provided students with a lot of detailed support as well as assessment; and the training day activities made them think it would be easier to teach the remix topic using the resources than develop their own activities.

First Lens Pedagogical Reasoning - Part A: Designing the Learning Experience

Comprehension of Remix Topic and Music ICT:

Michelle and John both described themselves as competent with ICT but only at a fundamental level of Music ICT. Brenton regarded himself as competent in both areas while Trevor regarded himself as very competent in both areas. They all said that they used ICT within their teaching for administrative, lesson worksheet preparation, student email communication and sharing resources on a school server. Michelle and John did not include PowerPoint style presentations and John was the only person not making use of multimedia in his teaching. Both Michelle and John had used a range of music software (Sibelius and ACID Music) and had some limited experience teaching using Music ICT but both were new to using Audacity (Appendix 33).

Transformation of Knowledge into a Teachable Form:

<u>Course Preparation:</u> Michelle and John's inexperience with Music ICT meant that both relied upon the instructional resources to focus student learning and make the remix activity 'teachable'. John was particularly pleased that the resources did not require the additional purchase of specific software or other equipment. Both teachers intended to use the resources to transform and develop their own novice understanding of Music ICT and 'remixing' while at the same time, facilitating and guiding students through the same process. They each spent time progressing

through selected activities with John suggesting “I can’t teach stuff if I didn’t know what we’re doing or how we’re going to do it”.

For Brenton, the resources were structured well enough to work with his own approach to teaching, while also representing a remix activity in a way that was appropriate for his students.

> I like that I won’t have to prepare the topic activities and will only have to guide the students which takes some of the teaching pressure off me and gives the students a bit more learning independence. (Brenton)

Trevor has developed a strong personal understanding of loop based music creation and has included a similar activity in his teaching for several years. He reviewed the MCUA activities and decided to use them but noted that he would modify and provide additional content to suit his context.

> I like the detail and structure within these activities and its really achievable but I usually prefer to teach using a less rigid structure and I’m not too sure about the assessment process and how it would work with these students so I’m planning to adapt the activities to a greater or lesser degree. (Trevor)

<u>Representation of Ideas:</u> By choosing to use the MCUA resources, teachers within this group did not need to create their own conceptual structure to represent the idea of what a remix was; this was provided within the learning activities and assessment materials. This meant that if they did choose alternative ways of presenting information to students, they would either need to modify the provided MCUA resources or supplement the resources with additional material.

Trevor was the only teacher within this group who chose to add additional resource material and this resulted in him considering alternative ways of explaining and representing audio editing techniques to those that were provided (this is discussed in the Adaptation paragraph that follows). Although Brenton did not create additional resources, observation of his classroom pedagogy indicated that he did draw upon his specific knowledge of the software and activity, presenting students with alternative representation possibilities when coaching on an individual basis.

<u>Instructional Selection:</u> Each of the teachers claimed that they valued independent student work so their approach to using the instructional resources emphasised this pedagogy.

Brenton decided that the selected teaching resources would allow students to work independently and progress at their own pace and deliberately chose a teaching style that was facilitative and coaching.

> I like being able to let the students work at their own pace independently and help them when they need assistance. If I'm the only way they get to learn editing skills it becomes too dependent upon me rather than them being responsible for their own learning. (Brenton)

This philosophy was reflected in his teaching approach that had few teacher lead demonstrations. The only whole class discussions observed and identified by Brenton concerned modelling self and peer assessment practices, using the supplied rubric.

Trevor identified that his preferred pedagogy was a blend of teacher centred demonstration followed by students progressing through structured activity sheets. He identified that the 'heavy scaffolding' would work well for most students but was concerned that the emphasis upon written language followed by experimentation would create motivation issues for some students. He recognised that he would need to consider further demonstration if all the class were to progress through the activity. There was a clear expectation that students were required to complete homework tasks outside of class time.

Michelle was mindful of her own inexperience and stated that;

> I chose only to do a bit of group discussion and mostly let student's work independently at their own pace because the resources strength is that they are quite detailed and provide a lot of learning support so I thought I'd mostly play the role of motivator and helper. (Michelle)

John planned to use an instructional strategy that combined students mostly working independently, supplemented by individual teacher assistance and some teacher led whole class demonstration and explanation of key procedural editing steps.

<u>Adaptation:</u> John, Michelle and Brenton decided not to adapt or modify the MCUA resources and directed students to progress sequentially through the structured activities. Brenton and John did indicate that they had completed a worked example derived from the first two activities that was played and discussed with their class. Both suggested that this first-hand experience had given them an insight into helping them understand the activities better and to anticipate what troubles students might experience.

Trevor worked through the first three MCUA activities and created his own course and lesson outline as a consequence of experiencing what was possible. Trevor's intention was to create short 'framing' activities that would then lead into the skill development activities contained within MCUA.

He chose to enhance several lessons with scenario activities that were designed to make the worksheet skill development tasks more relevant and specific to the students' experience. He commented that:

> During the second lesson I broke away from the audio editing tasks of the first activity and I played a remix which was perhaps more of a 'mash up' of two songs. We didn't discuss this too much but I set a homework task which was like a research question that expected students to ask their parents or a teacher what they thought a remix was – I even got them to use a class recording rather than the provided audio sample. (Trevor)

Trevor identified that additional content was created on a weekly basis and the adaptation and customising of the resources was planned for during the preparation stage but became more apparent as the remix activity progressed.

<u>Lesson Plans:</u> Trevor was the only teacher within this group to create clear outlines of course intention and lesson plans (Appendix 37). His original intention was to have one 50 minute lesson for six weeks and progress towards the fourth MCUA activity by week 6. Unfortunately, due to curriculum time constraints the fifth lesson became the final session and adjustments were made to the lesson content resulting in only the first four weeks of planned curriculum taking place.

Brenton, John and Michelle decided not to create written course or lesson plans as they believed the instructional resources provided students with enough structural guidance that would enable them to work at their own learning pace. Lesson observation and interviews identified that although nothing was written, they each had each given some thought to course flow and lesson structure. Michelle and John both liked being able to respond in a dynamic way to class progress while Brenton explained that:

> I'm confident and experienced enough with delivering a lesson so I don't need to write it down but I'll still prepare myself so that I know what I'm doing and what the students should be doing. On a certain level, I'm really not concerned with students completing the activities to the final steps but more in experiencing and developing skills with audio editing. (Brenton)

He indicated that in the initial first lesson he introduced the remix topic using his own completed example and this was followed by a brief discussion with students regarding the learning aims and outcomes. He earlier recognised that students would need some training in the use of PDF materials and multiple desktop windows so he included a discussion inviting students to offer solutions and demonstrations as to how good workflow could be achieved. Brenton's sequence of lessons was interrupted by a school musical and then became rushed towards the end, as a semester change-over occurred and practical and theory lessons took a higher priority. He explained that on two occasions the activities were used as relief lesson tasks supervised by an external teacher.

Tailoring: It is of interest that these four teachers considered that they did not modify or tailor their learning activities to suit particular classes or individuals. Rather they believed that they arranged their pedagogy structure to accommodate a range of student learning.

Trevor intended that the whole class would cover all lesson activities but had anticipated that some students would struggle with the reading and length of the activity. Rather than tailor the activities or lower the work expectations for individuals, he chose to offer more direct teaching assistance.

Michelle had one student in her class who was identified as requiring additional learning assistance and although the task expectation did not change, further individual support was provided during lessons by a range of teachers; Michelle, a student teacher, a special needs teacher, and fellow students.

Brenton and John identified that there were some special needs students within their class groups but considered that within this learning activity, their individual learning needs could be supported through additional explanation, feedback and monitoring.

First Lens Pedagogical Reasoning - Part B: Delivery of the Learning Experience

Instruction of Class:

Each research teacher was observed twice. Michelle's second and fifth lesson, Brenton and Trevor's second and fourth, and John's second and sixth lessons. Key points only from these observations have been selected and individual teacher lesson structures such as introduction, body, conclusion and assessment are not necessarily represented.

All four teachers prepared their teaching space prior to the commencement of lessons. Brenton, Trevor and Michelle each taught within a dedicated Music ICT computer room and despite consistency and confidence in the technology, they each preferred to get to class earlier than the students to confirm things were working correctly. John highlighted the difficulty of working within a multi-purpose general computer room and identified that it was discouraging to always have to collect and connect a portable data projector, and audio speakers.

All teachers commented that some of their lesson time was spent solving technical computer issues. A broad rand of technical matters were observed; these included network pauses, student work being lost on the server, and students just not following procedural steps. Trevor, John and Michelle all moved students to alternative spare computers when problems could not easily be solved and students were asked to start their work again from a designated point.

Brenton began each lesson with verbal instructions regarding learning expectations, continuing or completing tasks, and saving work safely. Some mention was made of homework and downloading the software for themselves and how useful these remix edits skills could be in recorded English presentations to get "that perfect monologue". Brenton chose not to use a whiteboard or data projector during either of the lessons and only once asked students to gather around a computer during an assessment of student work during the second observation. On the whole, students worked independently, reading and performing guided activity instructions, while the use of headphones created a very quiet environment. When students required further clarification they either asked their peers or raised their hand and waited for the teacher. There was generally a 1-2 minute wait but this could stretch up to 5 minutes if many required assistance. When Brenton was not assisting students he regularly would intervene and listen to a single students' work, asking critical questions and offering feedback regarding their progress. He often rephrased written instructions for students and frequently reiterated in a coaching style that students should revisit the notes and read instructions carefully, making it clear that "I shouldn't have to do your learning work for you".

Whole class teaching intervention occurred infrequently with only three instances being observed during the two observations. One instance was directing the class to a specific page of their PDF notes asking individual students to read-aloud the assessment process and asking other students to summarise what they were required to do with marking their own and their peers' work, using the evaluation rubric. This facilitative pedagogy was also evident in a peer listening and explanation discussion activity that Brenton initiated at the end of the first observed lesson. This was a form of rotation-listening that provided students with the opportunity to listen to other student's work and hear alternative viewpoints and explanations.

Formal class feedback occurred in the second observation when Brenton forewarned students to submit their completed work via the network folder for teacher evaluation. Brenton spent five minutes privately listening and looking briefly at various submitted pieces of student work. At an appropriate time, he directed the class to gather around a central computer while he read aloud a range of commentaries and evaluations and played their audio mixes. He used critical questioning to gauge student understanding and directed their focus towards techniques that he deemed to be successful. Through a process of prompted class discussion, students were led towards a shared understanding of what 'successful' looked and sounded like. Attention was focussed upon what was heard and read, what was deemed successful, and then how could it be made even better. When questioned about this, Brenton commented;

> I like to get the students suggesting things and the best way is to ask questions that makes them explain and give opinions of what is good and how it could be better. Getting them to a point where most of the class agree that something sounds good or could be made better if only they did such and such, helps them get their independent work to a class agreed standard. (Brenton)

Michelle began each lesson with directing students to the music computer workstations and instructing them to log on and commence their work. When the majority of the class had arrived, she provided a formal lesson introduction. This involved all headphones off and eye contact with the teacher. Michelle outlined what learning tasks and behaviour she expected from them and then allowed students considerable stretches of independent work time. During these periods, she observed and wandered the class and responded to student questions. Of pedagogical interest was that she gave a series of time warnings to students that shortly they would play their example to their neighbour and explain what they had been doing, what they had been successful with, and what they wanted to get better at. Michelle asked one particular student if she could use her work as an example for discussion and then plugged in a small portable speaker system and requested that the class gather around while the student explained and the Michelle prompted students to ask questions. This facilitative questioning strategy was regularly employed by Michelle and it directly engaged students and provided opportunities for students to clarify understandings and experience alternative viewpoints. An example of whole class instruction occurred when Michelle modelled the commentary and marking rubric, reading aloud the pre-printed activity instructions and visually reinforcing using a data projector. Student questioning was absent from this demonstration and Michelle commented later that:

> I felt I lost the girls during that lesson section because I really wanted to make sure we got through how to mark using the rubric but I forgot to include them in the process so I'll have to fix that next time. (Michelle)

During John's first observed lesson, he became noticeably frustrated that there were more students with their hands raised seeking assistance than he was likely to get to help so he directed students to seek help from their neighbours and warned that they all should be prepared to help each other. John was later to reflect on this comment and the change in class dynamics it produced.

> I was getting a bit stressed that so many kids wanted help and short of asking you (the researcher) I couldn't see how things could keep moving along. Getting them to help each other or kind of giving them permission to wander and assist changed things a lot and the students seemed to respond well to each other and probably enjoyed the remix lessons even more… some of the students were even bartering their skills in one of the lessons. (John)

Another important pedagogy John demonstrated was direct instruction and he did this to support two students who were off task playing a computer game. John moved between both students and explained that he was going to direct one student and the other was going to watch and then explain and demonstrate what they had done using their own computer. John guided the students through a workflow strategy that included using shortcuts such as 'Alt-Tab' switching between open programs and importing audio into Audacity. The second student followed these strategy steps and completed the activity during the demonstration example. The second part of the support focussed upon verbally guiding both students through a shortened version of finding the audio split points for words. John was to comment later that he had expected these students to struggle with task focus and motivation and that very direct instruction and guidance was needed for them to succeed with learning in this type of activity.

Whole class explanations of process steps were regular features of John and Trevor's instructional approaches. The following example illustrates many of the pedagogical features evident in teacher centred, whole class Music ICT demonstrations.

In this example, Trevor is verbally explaining and visually demonstrating the process steps he expected students to address using a prepared class recording, combined with the MCUA Activity 3 microphone recording and echo/delay processing steps. He is demonstrating using a prepared example.

> Can everyone just stop now? For ten seconds, very quickly just look up here. Yes, now! This is your task now that we need to do. You need to mute the countdown track and work on exercises 3A to 3 D on the tutorial. For 3E, mute the band track like this, and do exercises 3E on the countdown track. Once you've got that done this is your final task. Eyes here please or you won't know what to do. You are combining the countdown to start the band song. You need to or maybe adjust it (models countdown). And you'll have these effects on each of the songs. In about 20 minutes I'll talk about the types of things you are trying to do. Hopefully you save it as you go. For those who are still not up to speed, let me know and I'll come around and help you. (Trevor)

Trevor requires whole class attention and repeats several times the need to pay attention to his demonstration. The general statement of '10 seconds' is arbitrary, as this demonstration took 3 minutes. The demonstration was supported by reference to procedural tutorial notes which Trevor intended students to use to complete the activity. All students were required to complete the same activity and independent self-directed work was discouraged at this point of the lesson. The demonstration served as both an organiser and a process exemplar. The following example occurred later in the same lesson and illustrates how language heavy 'show and do' demonstrations can be.

> We are going to mute this track here. We are going to select all of this track here, and go to Effect. And then we are going to go Filter. It's slightly different to what the recording is. Now this selects the frequencies. OK, I'll do this part again, I've muted the top track, I've gone to this one. I've selected this one I'm going to effect and I'm going to this HPF. This High Pass Filter, you can select the frequency and it's like a wall. If you are ten feet tall you are going to be able to get over a 4 foot wall quite easily. If you are four foot tall, a four foot wall is going to be quite hard. So it's a wall that stops certain sounds below a certain range getting through and that's how it changes the sound. Can I have all of your eyes back here please? Now! The point of this exercise is to try and change the song to make it sound like it is from a radio or to only allow a set of certain frequencies to come through. So I want you to experiment. I want you to start low and each time press OK. We are not saving it so it won't change the original so you are going to experiment. That is essentially what these tasks are about. They are wanting you to experiment this way, try it this way, if you want to follow it from the tutorial do it that way. Have a go for 5 minutes. (Trevor)

Trevor's demonstration provided a variation on the provided resource material example and featured a clever use of the 'like a wall' metaphor. Repetition of visual demonstration steps also were used to emphasise important software procedural processes. He offered further encouragement by urging students to experiment with values and effects.

<u>Classroom Management:</u> During the two observed lessons, all four teachers dealt with some form of student off-task behaviour. Regular whole class reminders of staying on-task were common place with teachers identifying student distractions to be: general conversations; games; emails; and completing other school subject work. Retaining students focus during teacher centred, whole class demonstrations were minor issues for John and Trevor.

John and Trevor both regularly set time limits for individual and whole class activities and this was identified by both as a means of providing achievable focus targets for students.

> I find I like using a time limit with the whole class activities 'cause it adds a sense of urgency to getting the job done and staying on task rather than never ending self-directed time that I reckon doesn't work for most of the kids, (John)

Michelle and Brenton tended to quietly cajole students and they identified that teacher proximity generally seemed to reduce student off-task behaviour. Their pedagogy approach required far less whole class teacher intervention as compared to John and Trevor.

Evaluation and Assessment:

All four teachers chose to apply the summative assessment model contained within the MCUA resources; this required the following to be submitted to the teacher at the end of each activity (usually via email or server folder): an audio example; a commentary reflection; a rubric based self and peer assessment.

Each teacher indicated that their classes did not get as far as they had hoped. Michelle identified that all students submitted the first activity assessment and only two submitted the second activity. John identified that all students had completed activity one with the assessment, most activity two, but only two students had completed activity three with the assessment. Brenton indicated that with the exception of one student, all had completed activity one with assessment and the majority had also completed and submitted assessments for activity two. Several had started activity three but these were not completed.

All teachers indicated that they had discussed the assessment model with their classes during the second and third lesson. All teachers commented on the time that it took to mark student work with Michelle suggesting that it took 10-15 minutes. John suggested that regular formative feedback during class was perhaps the most helpful to students as it took him some time to grade, make comments and return student work as he was too busy assisting and solving student technical issues to mark during class time.

Trevor commented that he had extended the assessment model by designing ongoing assessment of shorter reflection tasks and submission of progressive work at the end of the second and fourth lesson; he believed the shortened lesson timeframe did not impact upon providing students graded feedback. Trevor did note that the additional assessment had an effect on how far students progressed through the learning activity skills and content and subsequently their depth of understanding.

Reflection on the Designed Learning Experience:

All four teachers indicated that they were pleased with how they had taught the remix activity using the provided resources and that they believed student learning and support for the activity was mostly positive. Each agreed that students had not got as far through the MCUA activities as they had hoped and that reduced lesson contact time had impacted upon this. Another contributing factor identified by all teachers was that very few students continued with this learning activity outside of class lesson time. Trevor summarised this well with the following comment:

> I only had one student that said they had installed Audacity at home and downloaded the learning materials and (*student name*) is a pretty switched on kid who likes computers and music technology stuff and they got the furthest in the class…. just because the program is freeware and the resources are freely available doesn't mean they (students) have the motivation, time or skills to carry on at home. (Trevor)

John was the most enthusiastic about how this learning activity had progressed. He had been concerned that after the third lesson there would not be enough lesson time to get through an adequate number of the activities so he decided to extend the learning time for this activity rather than diminish the content.

> I was really pleased with the way most students were working enthusiastically but couldn't see how in the six lessons (45 minutes each) they were going to get through

> much more than activity one and a bit of activity two, so I booked additional computer room time and took some time away from our 'prac' and theory lessons. (John)

John believed that this decision to add two additional lessons (from 6 to 8 lessons) resulted in more students progressing through to the assessment stages of the activities than would otherwise have been the case.

In contrast, Trevor reflected that his own pedagogy sometimes complicated the learning activity. Despite being pleased with the outcome of the learning activity and that the majority of students demonstrated a good standard of learning through their mixes and commentaries, Trevor identified that his own pedagogy required more teacher direction than the MCUA needed. He found that his prior experience developing Music ICT resources made it difficult for him to use the provided resources without modifying them in some way to suit his own pedagogy or curriculum needs. He stated:

> Adding in the extra bits to the activities like the student recordings and the parent survey and the class blog reflections was meant to personalise the activities more for the students. But thinking about it more that may have been more about my approach to teaching this stuff, and on the whole, I may have got the same *(student learning)* results just using the resources without the extra bits. (Trevor)

The enhancements that he had added to the resources gradually overtook the activity time, requiring additional verbal explanation and greater teacher direction.

Each of the four teachers suggested that the MCUA resources were successful for some students and less so for others. Brenton made the following observation:

> If I can generalise a bit, I found that the academic kids really liked the procedural structure and those that disliked reading and following processes would take as much direct teacher support as I could offer; their success still depended a lot on me. I don't think that's a fault of the resources just a reality of the different learning needs of the kids. (Brenton)

Michelle was pleased with the learning progress and positive attitude displayed by her class throughout the five lessons and although most had only completed one activity assessment she considered the learning activity was successful.

> I was pleased with what the girls got out of it 'cause there were some high energy moments during listening and discussion times .. even though we only got through one

> assessment…. I learnt more from observing how the girls worked and it made me consider more how I could help them without really knowing the answers or software tricks to do things. (Michelle)

Michelle's observation that she could support student learning through general pedagogy without necessarily being the subject knowledge expert suggests that detailed instructional materials do provide valuable assistance to teachers designing learning experiences in areas they are not confident or experienced in.

Second Lens: Checklist for Pedagogical Constructivist Depth

Following classification of the assembled data using the Second Lens Checklist for Pedagogical Constructivist Depth, results indicate that all teachers demonstrated a range of constructivist influenced pedagogy and that this pedagogy was likely to result in students adopting a surface approach towards their learning. Detailed explanations of this classification are contained within DVD Appendix 50. A brief analysis suggests that eight categories were likely to result in surface or deep approaches to student learning. These being: 3. Teachers as coaches; 4. Metacognition; 6. Authentic activities and contexts; 7. Primary sources of data; 12. Consideration of errors; 13. Exploration; 17. Scaffolding; 18. Authentic assessment. Of interest is that four categories were described as not being represented and these were: 2 Student-directed goals; 5 Learner Control; 1 1 Problem Solving; 14 Apprenticeship learning.

Michelle and Trevor both identified that constructivist learning philosophies had influenced their approach to designing learning and teaching and each had 12 classifications of surface or deep learning (n=18). Brenton had not mentioned constructivism in his teaching and learning influences but was identified as having 13 surface or deep classifications. John was classified as having only 9 surface or deep classifications. Additional discussion of this data is presented within the research summary question (p.258).

Table 18: Teachers Who Adapted Instructional Resources Checklist for Pedagogical Constructivist Depth

Teacher	Multiple perspectives	Student-directed goals	Teachers as coaches	Metacognition	Learner control	Authentic activities & contexts	Primary sources of data	Knowledge construction	Knowledge collaboration	Previous knowledge constructions	Problem solving	Consideration of errors	Exploration	Apprenticeship learning	Conceptual interrelatedness	Alternative Viewpoints	Scaffolding	Authentic assessment
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Michelle	N	N	S	S	N	S	S	S	D	S	N	S	S	N	N	S	S	S
Brenton	S	N	D	D	N	S	S	S	S	N	N	S	S	N	S	S	S	D
John	N	N	D	S	N	S	S	N	S	N	N	S	S	N	N	N	S	D
Trevor	S	N	S	D	N	D	D	S	N	S	N	S	S	N	S	N	S	D

S = Surface Understanding D = Deep Understanding N = Not Represented

Research Question Summary – Teachers Who Adapted Instructional Resources

Their Pedagogical Content Knowledge with regard to Music ICT

Several examples of possible Music ICT pedagogical content knowledge were displayed by Brenton, John and Trevor.

All three prepared worked examples or exemplars for their classes by completing the MCUA activities as part of their personal preparation to teach the remix topic. Both Brenton and John commented that this first-hand experience offered them an insight into their own understandings and potential misunderstandings that students might experience doing the same activity.

Trevor demonstrated a slight variation on preparing worked examples by designing course, lesson plans, and content sequencing while completing the worked examples. He also extended this to include additional assessment tasks that could also be regarded as specific Music ICT pedagogical content knowledge.

Brenton demonstrated the importance of understanding and knowing alternative representations of concepts and process steps in order to offer students alternative options or 'workarounds' when the demonstrated method did not perform as suggested.

Their Constructivist Influenced Teaching Strategies

Each of the four teachers demonstrated a range of constructivist influenced student centred teaching strategies. The use of a common instructional resource (MCUA) magnified the constructivist influenced pedagogical similarities and differences. The design of the activity resources precluded some categories (student-directed goals, learner control, problem solving, and apprenticeship learning) from being represented within a five or six lesson timeframe. The remaining fourteen categories provided considerable scope for each teacher to demonstrate a range of applications and uses.

Statistically, Trevor and Brenton were identified as having a larger number of deep and surface understanding categories represented as compared to John and Michelle. Some of these differences included: a greater emphasis on multiple conceptual representations; greater consideration towards creating metacognitive opportunities for self-analysis/reflection; connections of remix concepts to other applications; multiple assessment and evaluation opportunities.

A summary of the pedagogical indicators that seemed to create the opportunity for surface or deep understanding were: 1/ Designing a range of social interaction opportunities for listening, discussion and reflection; 2/ Adapting resources to suit the student, class and school context; 3/ Designing a range of opportunities for students to tutor or help each other learn.

3.6.5 The Teachers who Developed Their Own Instructional Resources

School Context

The three teachers comprising this group are Susan, Ryan and Simon. Details regarding their teaching experience and school contexts are contained within section 3.5.2 (Table 12). Of note is that all teachers within this group are in their thirties and none had MIDI equipped keyboards in their computer workstation environment. Each of these teachers chose to develop their own remix learning activity. The reasons for this choice included the following: previous experience teaching with and designing Music ICT learning activities; specialised knowledge of specific software; personal interest in creating teaching resources; confidence they could design the resources to be more tailored to their student's learning interests and their own school contexts. Ryan summarised this as follows,

> It's not that I think the MCUA resources aren't any good because I think step-by-step self-direction (and) assessment stuff would work well with students, just that I want to explore a different aspect to remixes which I think will work better at my school. (Ryan)

First Lens Pedagogical Reasoning - Part A: Designing the Learning Experience

Comprehension of Remix Topic and Music ICT:

Ryan and Simon both described themselves as very competent with Music ICT Proficiency and both had several years of experience recording audio and MIDI projects for school and personal use. Ryan still performed and recorded with semi-professional bands and was very enthusiastic about designing teaching resources and helping the students to create their own remixes. In the preceding two years he had taught several students a Year 12 Music Technology subject and was keen to prepare a learning pathway towards this subject for several students in this class. In contrast, Susan described herself as fundamental with Music ICT proficiency but competent with the use of ICT technology in the classroom. She did not regularly use audio and MIDI software and was mostly familiar with creating notation based arrangements using Sibelius. They all said that they used ICT within their teaching for administrative, lesson worksheet preparation, PowerPoint presentations, multimedia and sharing resources on a school server. Susan was the only teacher not using email to communicate with her students although her school did have this facility. Both

Ryan and Simon had used a range of music software but Susan was only familiar with Sibelius and ACID Music (Appendix 33).

Transformation of Knowledge into a Teachable Form:

<u>Course Preparation:</u> As each teacher had already decided to design their own activity and instructional resources their course preparation focussed upon developing their initial activity idea into a teachable form. Each teacher followed a similar pattern of preparing an example of a finished product, identifying skills and creating lesson notes.

Ryan began his course preparation by creating an experimental remix of the song Kryptonite using the software Adobe Audition (Appendix38). He claimed that he was very familiar with this software and had taught some classes in previous years using this software so it was already installed in one of the school computer rooms. He explained that,

> The initial planning remix took me about 4 hours and was fairly unstructured and had a lot of experimentation so it didn't make musical sense, but it did help me find the key editing and process points that I used later in the lesson materials. (Ryan)

Susan chose to develop and extend a 12 Bar Blues topic that she had created and taught in the preceding year using the music software ACID music. She regarded this as an opportunity to improve her knowledge of both the software and her teaching skills using Music ICT and explained it in these terms.

> I'm keen to revisit what I learnt last year teaching a 12 Bar Blues topic …. 'cause the students were really excited and motivated ….. I reckon I can make the activity even better with a remix focus for each 12 bar repetition. (Susan)

It is apparent that her motivation for teaching this topic was both for herself and her students. She identified that she began her preparation by creating a number of 12 Bar Blues progressions using the Rock audio loops that had come bundled with the ACID software.

Simon chose to apply his knowledge and experience of teaching using Music ICT to a remix activity requiring students to create a musically interesting remix using the wide range of audio and MIDI loops contained within the software Garage Band. He designed a scenario that was intended to make the activity more authentic and realistic; this being, the children's musical group 'The Wiggles' want your help to update their music to a more 'modern' sound. He began his course preparation by trialling a process of modifying existing MIDI files that were available on the internet. He described his reasoning in this way:

> I find I'm more confident and probably more help to the students if I've had a chance to practice and trouble shoot the activity before teaching it…. this helps me create the activity so that I know what sounds are available and what is more likely to suit the students better. (Simon)

This suggests that designing new resources allows tailoring to student groups and contexts. This approach of completing an example of the learning activity also resonates with the backwards design principles outlined within Understanding By Design (UBD) (Wiggins & McTighe, 2006). UBD places an emphasis on firstly knowing what it is you are going to be assessing and then developing a curriculum and course that supports learning to achieve this outcome.

Representation of Ideas: Ryan chose to represent the idea of a remix as a series of editing and 'creative modification' processes made to existing recordings. An important choice made at this point was that he expected students to choose their own song and that all editing and rearranging skill development processes would become part of their accumulative remix. This personalised the learning activity and kept the skill development embedded within the authentic learning activity rather than a series of skill development exercises.

Susan decided to represent a remix as a series of variations to an original piece of music and for her purposes this was melodically and rhythmically editing the original 12 Bar Blues audio loops with each repetition of the 12 bar progression. She explained this

> I'm kind of applying a method I use to teach arranging with Sibelius but instead of using notation I'm using waveform loops. (Susan)

The researcher found this approach interesting because it was a selective use of the term remix and one that was quite different from that used by the other research teacher participants. This representation was more in keeping with a traditional notation variation arranging technique than an emphasis upon audio process editing.

Simon represented his remix activity as a process of replacing or adding additional musical content to pre-existing MIDI files. He considered that this would allow students the opportunity to significantly alter the musical style, tempo and instrumental textures of the provided songs while hopefully still keeping them musically recognisable.

Instructional Selection: Ryan planned to have students work independently using a prepared course outline and assessment summary with instruction being delivered through teacher directed skill demonstrations. Students would then apply these core skills to their own-choice song or songs and they would progressively complete a commentary reflection that followed a teacher prepared template and worked example. He planned that students could catch up on missed work through teacher or peer assistance.

Although Simon originally planned to have student's work independently, a reduced number of computers resulted in a third of the class working in pairs so he chose to emphasise peer assistance and cooperation and he was later to consider that this had impacted upon student's progress and had challenged his own approach to pedagogy. He decided to prepare a brief activity overview to use his preferred instructional technique with Music ICT which was demonstrating and discussing the process to the whole class and then have the students repeat the process applied to their own project.

Susan's intention was to create an activity task sheet that outlined the software and musical skills required within the 12 Bar remix activity. She planned to use whole class, teacher centred skill development demonstrations for teaching key concepts and processes and students were to work in pairs due to insufficient computers.

<u>Adaptation:</u> Susan chose to adapt and develop and extend a 12 Bar Blues topic that she had created and taught in the preceding year using the music software ACID music. Ryan and Simon chose to develop a new activity but identified that they were drawing upon earlier teaching experiences, desktop publishing skills and previous experience preparing Music ICT activities.

Simon chose to adapt four MIDI files of Wiggles songs that he had found through an internet search as his template structures on which students were to build their own remix recordings. He also chose to adapt a four-page guide to MIDI Rhythm Programming that he had collected from a Music ICT PD session he had attended. He used this as a skill development instructional resource intended to help students create an introduction section for their chosen MDI Files.

<u>Lesson Plans:</u> Each teacher created a lesson overview plan that segmented the remix activity into manageable activities that were described as process skills or task requirements.

Simon created a two page 'Wiggles Remix' task sheet that included a scenario overview, a content overview for each of the six, 50 minute lessons and an assessment criteria that referred to evidence and quality of the key process steps such as: changing the MIDI File instrument sounds, adding new sounds, inserting a drum introduction and adding a voice track sung or spoken.

Ryan designed a course overview document that provided an introductory explanation of the learning activity, a four- week breakdown of the core editing skills, a choice of activity options and assessment criteria and a detailed commentary exemplar. The course was intended to be covered in six, sixty-minute lessons. Of interest was that in the two observed lessons, Ryan had created a brief handwritten lesson plan which he used as a personal organisation reminder as to what he wanted to include in the lesson.

Susan created a two page 12 Bar Remix task sheet that included a content overview for each of the six, 50-minute lessons as well as an assessment criteria that referred to evidence and quality of the key software process steps such as: combining, transposing, chord and song form, textural variation, mixing, FX, tempo change.

> I like to keep the class pretty much moving together through activities which makes it easier to demonstrate things but harder to keep the slower students moving along and not holding back those that want to move ahead. (Susan)

<u>Tailoring:</u> As the teachers had designed their activities specifically for these classes virtually no tailoring or modification of the learning activity was required. Susan was the only teacher who slightly modified her learning expectations. She identified that two students in her class were classified as having learning disabilities and she chose to modify their assessment expectations by reducing the number of 12 bar repetitions to two rather than three. Both students chose to work together as a pair and Susan commented that they frequently preferred to do this with most music activities although they tended to drift off-task. For two of the seven lessons an additional teacher came in and helped the students with understanding the instructions and Susan commented that she believed this made these lessons and the overall learning experience more successful for these students.

First Lens Pedagogical Reasoning - Part B: Delivery of the Learning Experience

Instruction of Class:

Each research teacher was observed twice. Susan's first and fourth lessons, Simon's second and fourth, and Ryan's third and sixth lessons. The discussion of these observations is presented in terms of pre-lesson, introduction to lesson, observation during the body of lesson, and lesson conclusion.

Each of the three teachers had spent time prior to their lesson preparing their teaching space and ensuring they had adequate copies of their instruction resources and that the required software was working correctly. For Ryan and Simon this had meant bringing additional equipment such as a portable data projector and long audio cables to connect student computers to a central audio system. Simon had been forewarned that the mounted data projector was not working and that three of the computers were not available which resulted in more students working in pairs without headphone monitoring than he had anticipated. Ryan had been required to move to different general purpose computer suite for his second lesson requiring him to oversee the installation of the software performed by a cooperative school computer technician. Susan had checked that she had adequate working headphones and headphone splitters and was relieved to hear that everything was working well.

Ryan introduced both lessons by entering the computer room with his students and immediately issued procedural directions setting a time duration for them to sit at a computer, 'log on' to the network, bring up their work from previous lesson, collect their headphones and get out their task sheet. During this short set-up time, Ryan located the student headphones and set-up his own computer and portable audio speakers and data projector. During the second lesson, he assisted several students with the 'log on' process that resulted in two students moving to different computers and another leaving class to seek a new password from the library. All students were in various stages of following these directions when he commenced his formal introduction. In each lesson, he asked a series of general class questions that lead students through a restating of their learning objectives and a verbal revision of some of the basic skills they had begun to use. The first observed lesson featured a fifteen-minute teacher facilitated demonstration of the week three FX processing steps (Appendix 39). Ryan initially modelled the first 'changing tempo' process but with each new FX processing effect, Ryan delegated greater responsibility to the students. Firstly Ryan verbally coached a student through the process of 'changing pitch' then directed other students to take over some of the guidance when a student demonstrator got stuck on a process step.

Susan introduced each lesson following a formal school routine requiring students to stand behind their chairs awaiting a formal welcome and reply. In the first lesson Susan asked students to sit where they currently were and that the seating combination would be sorted following her introduction. Her introduction included playing audio selections from two 12 Bar blues songs (a rock band version of Eric Clapton's 'Before You Accuse Me' and Bill Hailey's 'Rock Around The Clock'). She then discussed the underlying chord similarities and presented a 12 bar chord structure using the data projector. During this 20 minute presentation students were mostly receiving information with little interaction and were being dutifully polite. Susan then switched to her work exemplar; an ACID Music project and informed the class that this was the type of work they were going to create in the next six lessons. After playing the exemplar at a reasonably loud volume, she discussed the key structural elements of introduction, highlighting each repetition of the 12 bar cycle, solo instruments and the return of the A section and the ending. Each time she discussed a section she played a short sample of the section. She then loaded another ACID project that was titled 'Lesson One' and informed the class this is what they were aiming towards in the next 30 minutes. Susan indicated that she had considered the timing of the introduction and knew it would be long 20 minutes but thought it was time well spent to frame the learning activity.

Simon followed a similar introduction structure to Ryan by directing his class to set up their 'workspace' before commencing a formal introduction. Both lessons followed a similar approach with Simon stating the learning expectation followed by an editing or arranging process demonstration using the Garage Band software and a data projector. Key organisational points were progressively written on a white board and used as a reference by students to organise their work flow. This approach allowed Simon a great deal of flexibility for responding to current student progress.

During the body of the lesson, Ryan expected students to work independently but with some opportunity for peer assistance. He regularly tutored individual students and enthusiastically listened to student work offering feedback and encouragement. He also gave whole class coaching tips at irregular times such as "Remember to update your commentary!" or "When was your last screenshot people?" And humorously, "When did you last save your work or are you feeling lucky today?"

Peer listening was an important pedagogical consideration for Ryan and during the first lesson observation, he directed students to listen to their neighbour's work and comment on two things they liked and one thing they thought could be better. During the second observation Ryan connected an audio cable to each computer audio output and played each student's work and then led a class discussion on what they liked and what could be better. Ryan and the class were particularly enthusiastic regarding a mash-up which included humour, accurate editing and a rondo musical form including pitch variation.

Simon regularly wandered and assisted students by listening to their progressive work and providing feedback and encouragement. He used whole class skill development demonstrations to teach students technical software skills and processes and he used a range of questioning techniques to continually retain student focus and gauge student understanding. Most demonstrations were teacher led and focussed with some opportunities for student discussions, but they tended to become quite long- ten to fifteen minutes. During the second observed lesson, Simon displayed an alternative discussion strategy and directed selected students to play their projects to the class and then asked questions of them seeking an explanation of what they had done.

> I thought about our discussions last week and thought it was worth a try and the students seemed to really like hearing what each other were doing but it was a shame they were all a bit shy to explain what they had done. (Simon)

Susan often stood back and observed how students worked together and regarded incidental peer help and skill development as a natural and expected process that was desirable, but did not need to be encouraged because it "would occur anyway". Her approach to software skill development was teacher-centred with all process skills coming from whole-class teacher demonstrations that expected students to be working on a common activity and at approximately the same pace. Technical process issues tended to be solved in a very direct way; by efficiently telling students the process steps or by performing the combination of process steps and then requiring students to repeat the process. The student pairing restriction imposed by computer sharing was also a concern to Susan because she regarded changing student combinations compromised the project integrity as did prolonged student absences.

Susan and Simon both demonstrated strategies for assisting students who had missed skill development instructions due to absence. Susan asked the students who had missed the class to gather around a computer and she repeated a teacher demonstration of the procedural steps for fragmenting phrase loops. Simon used an alternative strategy to guide students through the process altering MIDI drum pattern rhythms. He gathered the students together around one computer and then had each student take turns following his verbal directions to perform the process steps. Both approaches presented the skill development from a teachers' perspective, however, the physical process associated with Simon's demonstration suggests a design towards greater student involvement.

All three teachers demonstrated some form of trouble shooting to help students solve or workaround computer issues. Ryan was observed helping a student find missing audio files from their remix project; Simon regularly needed to check system audio settings as another system program was altering the output settings; and Susan battled with a slow network, inconsistent audio file loading and inadequate computer memory to handle the students growing project sizes.

The conclusion of lessons was similar for all teachers. In general, one or two warnings were given that the lesson was soon to finish. Both of Simon's lessons finished in a teacher directed lesson summation which included students summarising what they had done followed by Simon outlining what the next remix lesson would focus upon in addition to reminding the students of different music lesson activities for their next class.

The first of Ryan's lessons did not include a formal summation and he explained his brief comment of "time to save your work and we'll continue with this next lesson" as a deliberate choice to give students maximum working time knowing that he would refocus them during his next lesson introduction. The second lesson observation conclusion had been preceded by a class 'play and tell' student discussion, so Ryan summarised what learning he had heard within their remix projects and then discussed how students were required to submit their remix and commentaries for marking.

Susan's conclusion for each lesson was similar with two warnings being given, followed by Susan providing a teacher summation of what students should have achieved and what they would be doing during the next remix lesson. Each of Susan's lessons concluded in a formal manner with all headphones collected by a nominated student and the class standing behind their seats waiting permission to leave.

Classroom Management: All three teachers were very influential and competent demonstrating pedagogy that continually focussed student activities towards completing a learning step that would contribute to completing the remix project. Ryan was perhaps the more relaxed teacher, allowing much good natured student chatter that occasionally drifted off task but which also reinforced student peer interaction and assistance regarding the remix learning task. Susan was very explicit;

expecting and demanding demonstrated on-task focus which frequently resulted in very quiet discussions amongst student pairs but with little interaction between groups and considerable teacher comment regarding staying on task.

Simon expected focussed individual work but this pedagogy was challenged by the circumstances of students working in pairs without headphones. He modified his teaching approach when three pairs of boys began being disruptive and inconsiderate with their playback volume and general chatter. Through direct teaching methods, he progressively guided the students onto task by verbally directing their editing focus over a period of 15 minutes. This focussed attention impacted upon the support he could provide to the rest of the class. He occasionally moved away to support other students but quickly returned in order to keep the boys progressing and minimising possible disruptive comments.

Evaluation and Assessment:

Ryan designed a very detailed assessment document that included a range of ways for students to demonstrate their understanding (Appendix 40). Students were initially required to decide how they wanted to represent their edited recordings and they were provided with three choices: a remix of single piece of music of their choice; a remix combining a number of songs of their choice; or a radio advert using at least three tracks containing a voice over with sound FX. Ryan indicated that the class was evenly divided between option one and two but no student chose to do the radio advert option. Ryan suggested within his reflection that this was probably because he had only briefly spoken about the radio advert process to the class but not demonstrated an approach to doing this.

Ryan commented that he had designed aspects of his assessment criteria and marks informed by his knowledge of the Year 12 Music Technology subject and this was evidenced by an emphasis upon; student self-reflection, providing supporting evidence with screen capture shots, and explaining editing choices and arranging decisions; all processes required by the SACE Stage Music Technology Subject. No self or peer assessment was used and all grades were determined by the teacher. Ryan identified that his detailed four page example commentary was considered really helpful by the students as it illustrated to them the depth and length of analysis that was expected (Appendix 38 and DVD Appendix 50). A check box style competency checklist was also included with the student assessment material and Ryan used this document as a means of discussing with students what technical skills were evident in their edited mix (Appendix 41). Ryan was the only teacher who routinely entered competency data into his computer checklist.

Susan's assessment design was included with the activity task sheet document and featured five sections each worth 20% of their overall grade. 60% of the student grade was based upon the evidence of and the quality of the required remix skills listed in the task sheet, as well as the quality of their personal learning effort demonstrated in class. The other 40% included two explanations and discussions of their remix. The first presentation was to the teacher and was intended to be of their progress work and the second was to be a class presentation at the conclusion of the learning activity. All assessment grades were determined by Susan and although students worked in pairs, Susan identified that she often gave students different grades based upon what she perceived to be the quality of their contribution to the overall work.

Simon's assessment plan featured three components: 15 marks for class participation and effort, 15 marks for demonstrated process skills, 20 marks for overall effectiveness of the completed project. All were teacher assessed.

Reflection on the Designed Learning Experience:

Simon was disappointed with how the Wiggles remix project had progressed and wasn't satisfied with the standard of student work that was submitted. Although he had managed to complete all of his planned lessons and intended skill activities, he believed that most students were not coming up with the musical outcomes he had expected:

> I'm a bit annoyed that this activity got bogged down and never really got to where I was hoping it musically would. There were some really good exceptions but not as many as I'd expected. This class had some troublesome ones (students) that never bought into the activity and it seemed like I ended up managing them rather than helping the whole class progress… I think I really needed to give more feedback to student pairs and possibly self-help options rather than them waiting for me to explain it to them. (Simon)

Simon contacted the researcher three months after this data gathering and was pleased to say that he had taught the remix activity to another group of year 7 students and that this was a far more successful experience, stating "an interested musical class makes a huge difference". Simon indicated that he had changed some of his teaching strategies following the first remix teaching experience and that he was now placing a greater emphasis upon shorter directed skill development with greater use of student peer assistance, as well as providing more time for students to listen to each other's progressive work.

Ryan was quite pleased with what the students had achieved with their remix activities and regarded their commentaries as very pleasing. He identified that only two of the fifteen students had not submitted their recording or commentary by the assessment deadline. However, as he had been conducting skill competency checks, as well as observing their remix editing and journal writings during class, he could at least make a case that for these two students a level of learning had taken place.

Ryan reflected upon the difficulties of having students developing skill competencies working on individual unique songs and made this comment referring to creating beat accurate audio loops:

> They probably need a couple of lessons on beat timing and although I demo'd it to the whole class, I had to help nearly all of them out individually as each song was pretty unique and needed different considerations like upbeats and anticipations. Next time, I reckon just using one class song for developing a core skill activity session would be quicker and then they have to use it with their own song but then I reckon we'll still run into the same problems so it's probably always 'gonna' be messy. (Ryan)

Susan reflected upon her experience teaching this activity and she was pleased that she had chosen to revisit and extend her original 12 Bar arranging concept. She commented that:

> "I learnt a lot more about the technology from teaching this activity and I know the students enjoyed it too."   (Susan)

Overall, she considered that the learning activity mostly worked well with some students producing what she considered to be quite good work, however, she expressed frustration that she had to make compromises regarding assessment and content coverage.

> I was pretty pleased with how the student's worked and the stuff they produced but we ran out of time to complete it to the depth I had planned. I glossed over and left out some of the skill sections 'cause it was hard enough just getting through their explanation and discussion with me so class presentations needed more time that we just didn't have so that was a bit frustrating. (Susan)

Susan went on to add that she occasionally had to make similar curriculum and assessment compromises in other areas of the music subject (performance and theory) due to changing circumstances with assessment deadlines.

Ryan was the only teacher who claimed that students worked on their remix outside of regular class hours. Ryan had not expected this. One student asked to use the computer lab on several occasions during lunch and after school while another two had ‘acquired’ a copy of the software program and had carried on with their remixes at home. Ryan indicated that all three students progressed significantly further than the rest of their classmates demonstrating more imagination and greater editing accuracy.

Second Lens: Checklist for Pedagogical Constructivist Depth

Each of the research teachers identified constructivism as an influence upon their teaching pedagogy and analysis using the Constructivist Checklist Lens found that their observed pedagogy did include a range of constructivist influenced student centred pedagogies. Table 19 includes a summary of these findings; the analysis that this table is based upon can be found in the DVD Appendix 50. All teachers were categorised with at least 12 deep or surface categories with the only category not being represented within this table being number 15, Conceptual Interrelatedness. Additional discussion regarding these classifications is contained within the research question summary (p.274).

Table 19: Teachers Who Developed Own Resources Checklist for Pedagogical Constructivist Depth

Teacher	Multiple perspectives	Student-directed goals	Teachers as coaches	Metacognition	Learner control	Authentic activities & contexts	Primary sources of data	Knowledge construction	Knowledge collaboration	Previous knowledge constructions	Problem solving	Consideration of errors	Exploration	Apprenticeship learning	Conceptual interrelatedness	Alternative Viewpoints	Scaffolding	Authentic assessment
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Ryan	D	D	D	D	D	D	D	D	D	S	D	D	D	S	N	D	D	D
Simon	D	N	D	S	S	D	S	D	S	N	D	S	S	N	N	S	S	S
Susan	S	N	S	S	N	S	S	S	S	N	S	S	S	N	N	N	S	S

S = Surface Understanding D = Deep Understanding N = Not Represented

Research Question Summary – Teacher Who Developed Their Own Instructional Resources

Their Pedagogical Content Knowledge with regard to Music ICT

Several possible examples of pedagogical content knowledge unique to Music ICT were displayed by Ryan Simon and Susan. These include: preparing a worked example; sequencing and ordering of learning within task sheets; designing learning assessment criteria; providing a variety of opportunities to display understanding; multiple representations and alternative methods of achieving musical effects and devices using different software specific processes.

Their Constructivist Influenced Teaching Strategies

All three teachers demonstrated a range of constructivist influenced pedagogies through their course design and lesson delivery. The self-design of their remix learning activity enabled greater opportunity for each teacher to design the activity to suit their preferred pedagogical approach as well as match their own Music ICT skills and strengths.

Ryan's pedagogical design and approach to this Music ICT activity suggested that students were likely to adopt a deep approach to student learning. This is largely due to his self-developed topic and resources enabling students to represent remix skills using their own choice song combined with a teaching style that emphasised listening, discussion and self-directed experimentation. Simon's pedagogical design and approach was likely to lead students more towards a surface understanding than a deep approach to their learning. This was attributed to, a lack of student directed goals, limited verbal and written reflection, limited student lead discussion, and limited class listening to and discussion of student work. Susan's pedagogy and learning design suggests that students are likely to adopt even more of a surface approach to their learning as far greater teacher direction was the preferred pedagogy with less student listening, whole class discussions or verbal or written reflection regarding their learning.

3.6.6 Establishing an Average Pedagogical Depth

An overview of the identified pedagogical constructivist depth for the ten research participants is provided in Table 20. To enable further comparison and analysis of this data, a simple frequency analysis was performed on the three levels of understanding assigned to each teacher. The method involved adding together the total number of instances for each teacher and then dividing this value by 180 (the total number of teachers (10) multiplied by the total number of constructivist categories (18) 10 X 18 = 180). The resulting value was then turned into a percentage and was referred to as the Average Pedagogical Depth. This quantified value provided a measurement to compare the extent to which certain pedagogical factors may have contributed to the pedagogical constructivist depth. Table 21 demonstrates how this is applied.

Table 20: Overview of Teachers Pedagogical Constructivist Depth

	Checklist for Pedagogical Constructivist Depth Pedagogy Promoting Surface or Deep Understanding S= Surface Understanding D = Deep Understanding N = Not Represented	Brenton	John	Michelle	Rebecca	Tina	Trevor	Mick	Ryan	Simon	Susan
1	Multiple perspectives	S	N	N	N	D	S	D	D	D	S
2	Student-directed goals	N	N	N	N	N	N	S	D	N	N
3	Teachers as coaches	D	D	S	S	D	S	D	D	D	S
4	Metacognition	D	S	S	S	D	D	S	D	S	S
5	Learner control	N	N	N	N	S	N	D	D	S	N
6	Authentic activities & contexts	S	S	S	S	S	D	D	D	D	S
7	Primary sources of data	S	S	S	S	S	D	D	D	S	S
8	Knowledge construction	S	N	S	S	D	S	D	D	D	S
9	Knowledge collaboration	S	S	D	N	D	N	D	D	S	S
10	Previous knowledge constructions	N	N	S	N	D	S	S	S	N	N
11	Problem solving	N	N	N	N	N	N	D	D	D	S
12	Consideration of errors	S	S	S	S	D	S	D	D	S	S
13	Exploration	S	S	S	S	S	S	D	D	S	S
14	Apprenticeship learning	N	N	N	N	S	N	S	S	N	N
15	Conceptual interrelatedness	S	N	N	N	D	S	N	N	N	N
16	Alternative Viewpoints	S	N	S	N	D	N	S	D	S	N
17	Scaffolding	S	S	S	S	D	S	D	D	S	S
18	Authentic assessment	D	D	S	S	S	D	S	D	S	S

Table 21: Average Pedagogical Depth

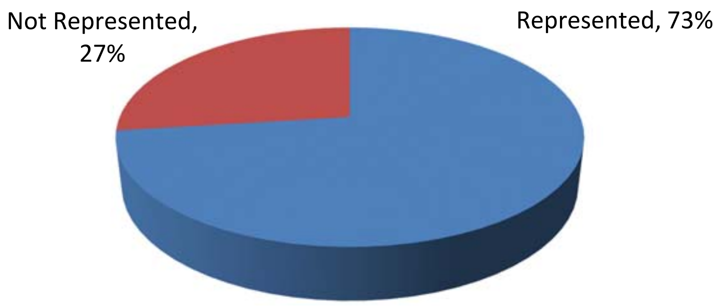
Checklist for Pedagogical Constructivist Depth Establishing Average Pedagogical Depth	Brenton	John	Michelle	Rebecca	Tina	Trevor	Mick	Ryan	Simon	Susan	TOTAL (180)	%
Deep Understanding	3*	2	1	0	10	4	11	15	5	0	51	28%
Surface Understanding	10	7	11	9	6	8	6	2	9	12	80	45%
Not Represented	5	9	6	9	2	6	1	1	4	6	49	27%

* These numbers refer to the total of Deep, Surface or Not Represented constructivist depth values for each teacher. The sum total for each teacher is 18.

Average Extent of Pedagogical Constructivist Characteristics

A quantified value representing the average extent of constructivist characteristics demonstrated by the research teachers is achieved by adding together the Deep and Surface Understanding percentages. This indicates that on average, the eighteen constructivist characteristics were represented within their pedagogy 73% of the time, as shown in the following figure 61.

Figure 61: Extent of Constructivist Influenced Teaching Strategies



Factors Influencing the Depth of Constructivist Teaching Strategies

Additional analysis of this data was possible using a variety of teacher groupings. Of particular interest are finding combination factors that produce an increase in Deep Understanding and a decrease in Surface and Not Represented values. A simple subtraction process was applied to produce a positive or negative percentage factor difference between the Average Pedagogical Depth and that of the Teachers included within the factor combination. An example of this process is contained in Appendix 42-44.

Ranges of teaching factor combinations were experimented with. These included: teaching age; years of teaching experience; ICT teaching proficiency; teacher gender; teaching and learning influences; use of instructional resources; and Music ICT proficiency.

Three teaching combination factors produced larger positive values for Deep Understanding as well as greater negative values for the Not Represented category. These combinations were: Music ICT proficiency (Appendix 42); developed own instructional resources (Appendix 43); teaching and learning influences (Appendix 44). Table 22 illustrates the Factor difference values. (Within this analysis, positive or negative values for surface understanding were not relevant as its percentage value was a direct result of the Deep and Not Represented values.)

Table 22: Comparison of Factors Promoting Deeper or Surface Understanding

Pedagogical Constructivist Depth Checklist Comparison of Factors Promoting Deeper or Surface Understanding	Music ICT Proficiency (very competent)	Music ICT Proficiency (fundamental /competent)	Own Developed Resources	Adapted Resources	Constructivist Influenced	Not Constructivist Influenced
Deep Understanding	+21%	-13%	+16%	-9%	+8%	-19%
Surface Understanding	-10%	+6%	-5%	+2%	-2%	+3%
Not Represented	-11%	+7%	-11%	+7%	-6%	+16%

The bold values indicate the pedagogical factors which have produced the largest factor difference as compared to the Average Pedagogical Depth. Alongside each of these is the related alternative category generally illustrating the opposite mirrored values.

From this representation of the data, it is apparent that all three pedagogical factors contribute to supporting teachers design deeper learning possibilities with Music ICT. The researcher suggests that the extent to which Music ICT proficiency is the most important factor may be magnified and overstated due to the small data set.

3.7 Conclusion

This conclusion firstly presents the findings from this research by addressing the three research questions identified by this study. Recommendations based upon these findings are then presented along with a brief contextual explanation. The limitations of this present research are considered and this is followed by recommendations for further study.

3.7.1 Findings From Research

What are the teachers' pedagogical considerations during this learning experience?

The data discussions have produced a rich diversity of pedagogical themes which complement the categories that Shulman and Webb have provided in the Pedagogical Reasoning Model. The researcher developed themes are used to outline the findings for the first research question.

This study has found that teachers' *ideas, values and beliefs* regarding the purpose and focus of learning and teaching were reflected through their pedagogical choices regardless of Music ICT confidence or experience. It was apparent that each teacher selected and designed their learning activities with the intention of engaging and motivating students to learn and understand musical knowledge; however, teachers who were able to articulate a learning philosophy and demonstrate this within their teaching practice, were more likely to consider and represent a broader range of pedagogy.

The findings suggest that *research preparation* for teaching with Music ICT generally involves personal experimentation exploring musical concepts and possible representations of software specific task processes focussed towards the creation of a teaching exemplar. Within this study, the teachers' comprehension and understanding of the remix subject matter varied considerably and influenced how they represented musical concepts within their learning and teaching design.

An important consideration for each teacher was the development or selection of *instructional resources*. This research found that a teacher's Music ICT proficiency contributed in the following ways:

- A teacher possessing higher levels of proficiency with Music ICT generally prefers to create their own instructional resources or modify existing resources to suit their contexts and pedagogical approach.

- Teachers with lower levels of Music ICT proficiency tended to adopt existing instructional resources as an all-in-one learning solution.
- Teachers with lower levels of Music ICT proficiency did not regularly use Music ICT to create music.
- Teachers who developed their own Music ICT teaching resources were generally better at contextualising the learning for their classes.

Other findings suggest that instructional resources based upon sequential Guided Activity learning steps provide greater learning certainty but initially limit student choice. Teachers identified that detailed skill developments suit certain types of learners (procedural), and those learners who dislike reading and following process steps tended to rely upon the teacher to stay on task. Consequently, to design student-centred learning activities requires a teaching pedagogy and instructional resources that provide opportunities for meaningful student choice and flexibility.

This research found that *course and lesson plans* for Music ICT are generally created to serve the dual purpose of organising the learning activity, as well as informing students of the learning task, timeline, and assessment. Task sheets tended to use a 'lighter-scaffold' suggesting and indicating, without being explicit, while lesson specific teaching plans generally occurred on the day of the class and were intended as an organisational reminder for the teacher. Lesson continuity was found to be important for maintaining student focus and motivation and that reduced lesson time compromised student learning and understanding.

The analysis of teachers' *classroom practice* identified a range of important pedagogical themes that are provided in a list form grouped as: skill development; instructional models; clarification of student understanding and knowledge; and teacher Music ICT proficiency:

- Software specific skill development which focussed upon activity specific remix concepts was a feature of all teachers' pedagogy.
- Teacher directed skill development was most effective when supported by task sheets or accessible revision material.
- Teacher directed skill development made it difficult for students to revise or catch up if they were absent from lessons.
- Instructional models which tended to lead towards less student choice included: teacher centred whole class demonstrations, step-by-step 'show and do' demonstrations, direct instruction, individual sequenced learning.

- Instructional models which tended to lead towards more student choice included: teacher facilitated whole class listening and discussions, small group or peer listening and explanation, teacher coached student demonstrations, peer coaching, designed collaboration.
- Clarification of prior student knowledge and understanding generally occurred during class discussion and student demonstration.
- Clarification of student understanding as well as checking for misunderstandings mostly occurred during individual tutoring and to a lesser degree, class discussion.
- Teacher's possessing higher levels of proficiency with Music ICT generally adopted a flexible and interactive pedagogy with students.
- Teachers with lower levels of proficiency with Music ICT tended to adopt a more didactic and teacher-directed style. This pedagogical behaviour may be unique to this activity.
- All teachers interacted with students – wandering and checking work, coaching, tutoring, questioning, and praising.

The findings regarding evaluation and assessment indicated that regular modelling and discussion of assessment processes by the teacher made student task completion more likely. Interwoven and ongoing assessments including understanding explanations and competency demonstrations allowed a broader range of learning and understanding to be displayed by the students while self and peer assessment seemed to work best when a descriptive rubric was used. Most teachers identified that Music ICT homework was unlikely to be completed outside of class time and that 'end of activity' summative assessments were often compromised by a range of circumstances.

Specialised Music ICT Pedagogical Content Knowledge:

Can specific examples of pedagogical content knowledge unique to Music ICT be identified?

Findings for this second research question suggest that specialised Music ICT Pedagogical Content Knowledge does exist and it is represented within teachers learning design and classroom pedagogy. The most important and influential example of Pedagogical Content Knowledge was identified to be:

- A teacher's ability to regularly connect musical concepts to software specific processes which could then be applied to produce an appropriate and successful musical outcome.

This knowledge was evident within all aspects of the learning design; planning, structuring instructional resources, creation of exemplar audio recordings, skill development instruction, tutoring, and assessment.

Other instructional planning examples of Music ICT Pedagogical Content Knowledge included:

- The setting of assessment criteria and rubric descriptors.
- The formation of hierarchical skill lists and competency checklists.
- Categorisation and sequencing of process specific knowledge applicable to the remix topic.

Examples of Music ICT Pedagogical Content Knowledge that can be represented during the delivery of a lesson include:

- The representation of concepts in a variety of ways using a number of alternative software specific process skills.
- Directing class and peer listening and discussions towards remix concepts and appropriate use of musical and software terminology.
- Knowledge to discern between software or network fault and student process misunderstanding or musical misconception.

This research suggests that specialised Music ICT Pedagogical Content Knowledge is constructed through a prolonged or continuing teacher learning process that includes, professional pedagogical training, general ICT training, regular hands on experience creating music using Music ICT, mentor support, regular teaching experience designing learning using Music ICT, and professional dialogue and reflection.

Extent of Constructivist Characteristics:

To what extent does the pedagogy reflect constructivist influenced teaching strategies?

For the third research question, this study found that constructivist influenced student-centred teaching strategies were evident in all ten teachers' pedagogy. On average, the eighteen constructivist characteristics listed within the Checklist for Pedagogical Constructivist Depth were represented within a teacher's learning design approximately 75% of the time.

The research also suggests that the extent to which these were likely to lead students to adopt a deep or surface approach to their learning was influenced by three factors:

- A teachers' values and beliefs regarding how students learn.
- A teachers' design or use of instructional resources.
- A teachers' understanding of and proficiency with Music ICT.

Of these, the most important factor was cautiously determined to be the teachers' Music ICT proficiency, providing additional support to the Pedagogical Content Knowledge proposition of teachers possessing specific learning domain and learning activity knowledge.

3.7.2 Limitations of the Present Research

This research is limited by a range of factors. These include: a specific focus upon only one application of Music ICT; a select range of research teachers; teacher curriculum compromises; and possible research bias in data collection and analysis.

This qualitative examination has explored the planning, preparation and delivery of a Music ICT specific topic by ten secondary classroom teachers. Although the observed pedagogy of the teachers used in this research represent a certain range of strategies for using Music ICT, it is unlikely to include the full range of possible strategies.

Another limitation is that the observed teacher pedagogy only represents one of many possible applications for using ICT in secondary music education. A notation based focus, multi-track audio recording, aural and theory skill and drill practice, or historical internet based research may all provide opportunities for alternative teacher pedagogy to be demonstrated. Curriculum compromises made by teachers due to reduced lesson time also impacted upon completing the planned learning content, thereby reducing the opportunity for additional teaching and learning behaviours to be observed.

The four data gathering methods that were used (questionnaire, interview, observation, and document analysis) provided rich and detailed data. However, each of these methods involved high degrees of possible error due to researcher inconsistency, unintentional bias and the need for inference and interpretation of data. In an effort to reduce this influence, the researcher applied a triangulation approach of checking the full range of assembled data before applying inferences and interpretations to events. The use of analytical lenses and their organising categories may have also narrowed and focussed the data presentation discussions, making the researcher and reader blind to other interpretations of the same data. A team of researchers observing and discussing data may have provided additional consistency particularly with improving the reliability for assigning the likely learning approach adopted by students using the Pedagogical Constructivist Characteristics Checklist.

3.7.3 Recommendations from Findings

The following recommendations are the researcher interpreting the implications of the findings from the point of view of a teacher involved in designing curriculum. The evidence from this in-depth qualitative study suggests that Music ICT teaching is most effective when:

Teachers regularly create music using Music ICT tools to improve and maintain their Music ICT proficiency

This study found that teacher proficiency with Music ICT was a factor in designing greater student choice and personalisation within the design of the learning activity and instructional resources. It was also a contributing factor in enabling more flexible and responsive classroom pedagogy due to a greater breadth and depth of teacher knowledge, understanding and confidence with using the software and hardware tools. Authentic teaching related applications that can provide teachers with a reason to regularly create music using Music ICT tools include: composing and arranging notation based music for classes and co-curricular ensembles; recording musical performances and sharing these within the school community; creating multi-track recordings using overdub techniques; editing and improving multi-track recordings using production processes.

Teachers consider how and to what extent their learning philosophy is represented within their general teaching pedagogy and specifically within their Music ICT pedagogy.

This research observed that teachers who were able to articulate a learning philosophy were more likely to consistently represent this within their teaching pedagogy. This consistency was more likely to provide a broader range of opportunities for students to adopt deeper approaches to learning through the alignment of resource design, instructional pedagogy, and learning assessment.

Teachers design learning experiences to encourage diverse creative representations of music concepts and learning objectives using Music ICT tools

This study identified that a common learning activity, such as musical remixes, could be represented and interpreted by teachers and students in a range of ways that may be contextually appropriate but may be restrictive towards students developing deeper musical understanding. Learning designs that encourage and accommodate a broad range of personalised student representations are more likely to provide opportunities for learners to demonstrate a deeper understanding of the connection between Music ICT process skills and musical concepts within their learning project.

Teachers explore ways of creating and representing musical concepts using software specific processes.

It was evident that teachers engaged in hands-on learning and exploration when preparing to teach using Music ICT tools. This process identifies for the teacher the musical affordance of the software (what musical outcomes it can produce easily) and generally involves producing a learning activity exemplar. It is recommended that during this learning and exploration process, teachers list the musical concepts required by their learning activity (pitch, duration, rhythm, texture, tempo, form, dynamics, expression etc..) and connect these concepts to software specific processes skills (grid edit screen, drawing tool, quantize and snap, patch change and track blending, automation tracks, arrange screen, velocity and controller automation, modulation and drawing tool).

Teachers identify and develop Music ICT instructional resources that are contextualised to enable authentic and personalised representations of musical concepts while also providing specific and explicit software process support.

This study observed that detailed instructional resources were most effective if they were closely linked to the learning activity and could be readily applied to personalised student representations. Therefore, the more a teacher can adapt existing resources, or develop their own resources, to provide specific and explicit instructional guidance that students can apply in a personalised manner, the more likely student learning will be effective.

Teachers design learning plans and task sheets that organise and direct student learning in a measurable and achievable manner.

The structuring of the learning plan should be realistic in scope and breadth to allow enough in class lesson time to complete the learning activity, as well as provide sufficient milestones to acknowledge measurable learning progress.

Music ICT skill development activities are presented using a range of instructional strategies.

This research identified the following range of instructional strategies: teacher coached student demonstrations, teacher facilitated whole class listening and discussions, small group or peer listening and explanation, peer coaching, designed collaboration, teacher centred whole class demonstrations, step-by-step ‘show and do’ demonstrations, direct instruction, individual sequenced learning.

Teachers design structured opportunities for students to listen, explain and discuss their musical work.

Findings from this study indicate that music teachers could provide greater opportunity for deeper student learning through designed social-interaction within lessons. This could be: peer listening exchanges, small group listening rotations, play and explain discussions. The focus or intention of this interaction is to expose students to alternative viewpoints and representations of the learning activity and to stimulate self-reflection through the explaining and discussing of their work.

Teachers design Music ICT assessments that support a range of multiple representations of understanding

This research found that most Music ICT assessments focussed upon evaluating student understanding through summative tasks and reflections and these were often compromised by changes in lesson schedules and student absences. Multiple and interwoven assessment strategies that complement and are in addition to summative models were regarded as more likely to provide multiple representations of student understanding. These could include; checklists for competency based skills, discussion and explanation, and process journals.

3.7.4 Recommendations for Further Research

The findings from this study have highlighted a range of Music ICT pedagogical practices that warrant further consideration and examination. Additional studies may establish if the learning design processes of teachers engaged in other applications of Music ICT teaching offer supporting or contrasting perspectives regarding the preparation of instructional resources, classroom pedagogy and assessment of learning. Further research using other Music ICT activities may also indicate to what extent the identified examples of Music ICT Pedagogical Content Knowledge are contextually specific or transferable to other learning and teaching situations. Additional exploration of constructivist influenced teaching strategies as applied to other Music ICT uses may provide further insight into the teaching practices that promote deeper student learning and deeper musical understanding.

Further studies are recommended to examine and compare secondary music teachers' pedagogical practice across a range of music learning experiences such as: ensemble conducting, music theory teaching, and music listening and analysis, or notation based composition.

The dual-lens analysis model, incorporating the Pedagogical Reasoning Model and The Checklist for Pedagogical Constructivist Depth, has produced a much deeper understanding of pedagogical classroom practice which suggests that this analysis model may have further application in other qualitative studies exploring music teacher pedagogy.

Research Folio Topic 3

Creation of a Music ICT instructional resource that demonstrates a constructivist influenced Music ICT learning framework and design model

4.1 Introduction

The third folio topic is presented in the form of a researcher-created instructional resource titled *Boomacious*. The resource provides a designed musical learning experience that integrates constructivist influenced Music ICT pedagogy within a secondary school learning activity. The *Boomacious* resource serves as both a practical instructional resource for secondary school Music ICT, as well as being a sample of a researcher developed Music ICT learning framework and instructional design model.

The instructional resource itself is accompanied by an exegesis (a critical explanation) detailing the theoretical underpinnings and developmental considerations that have influenced its development. A guided analysis of the *Boomacious* instructional resource then explains how the work represents the theoretical underpinnings of constructivism, constructionism, instructional design and guided instruction.

The significance of the resource is then discussed in terms of current practice with regard to Music ICT instructional resources. A conclusion and recommendation section suggests further possibilities, limitations and transferability of the learning framework and instructional design model to other educational applications.

4.1.1 Research Presentation Model

The presentation of the researcher-developed instructional resource demonstrates the researcher's investigations into Music ICT instructional resources within an applied and authentic context designed specifically for a secondary school music learning experience. This portfolio topic therefore follows a different approach to education research and does not involve the gathering and analysis of data which take place in much quantitative and qualitative research. The School of Education (University of Adelaide) has endorsed this as an appropriate research project for a Doctor of Education portfolio (see Appendix 45). *Boomacious* is published as an instructional resource which is available through the Music Creation World website (http://www.musiccreationworld.com) which is the author's own website.

4.1.2 The Boomacious Learning and Teaching Context

Boomacious is an activity based music ICT learning experience that focuses upon building and developing the musical understanding and creativity of secondary school students aged 13 -18 who possess fundamental music technology skills. The instructional resource guides and supports the learner through a structured seven step process that makes more likely the construction of learner knowledge and musical understanding demonstrated through the use and application of music technology tools, software specific process skills and musical concepts.

The product outcome for students is the creation of a 40 second drum machine composition that demonstrates pattern variation and rhythmic development combined within a sensible musical form. The learning outcomes include: musical concepts such as rhythm, tempo, texture and style; software specific skills such as inserting virtual instruments, creating and saving rhythm patterns, mixing to audio files; and transferable understandings such as planning, analysing, reflecting, revising, and explaining.

Boomacious is designed specifically for the music software Pro Tools (AVID, 2012) version 10.3 (but is also suitable for Pro Tools version 7 upwards) running on a PC or Mac computer platform. The activity focuses upon a software based virtual instrument, Boom, which is an electronic drum machine included with the Pro Tools software.

As an instructional resource, *Boomacious* is published in a Portable Document Format (PDF) with activity specific 'show me how' embedded movie links to a researcher developed YouTube education site. It is intended that students use the PDF in its digital form rather than as a printed document so that the instructional movie links become an integrated part of the student's instructional choice. This requires the learner to view the resource on their computer monitor. Depending upon the monitor size, it may be necessary to resize program windows or toggle open applications. An alternative to using the *Boomacious* PDF resource on the same computer as Pro Tools is using tablet style digital devices such as the iPad (Apple, 2012).

The *Boomacious* resource is intended for small group and whole class instruction, emphasising interdependent, peer assisted learning, although it is also suitable for independent learning. For the teacher, a directive and active pedagogical approach (Hattie, 2009) is important for guiding students through the discovery and exploration steps in order to clarify student understandings, correct misunderstandings and direct the students to progress at their optimal learning pace.

This instructional resource requires access to a music equipped computer facility that includes Pro Tools software and audio interfaces and monitoring facilities. MIDI controller keyboards are optional. There should be enough computers for students to work individually or in pairs.

4.2 Presentation of Instructional Resource - Boomacious

The *Boomacious* learning activity that is presented within this chapter is an embedded PDF version of the digital resource and therefore has reduced graphic resolution and inactive web links. This 'paper-based' format is a functional way of representing the *Boomacious* instructional resource within a traditional thesis folio structure. However, it is not its intended presentation format. To better understand this work, it is recommended that the reader use the instructional resource as it has been designed; as part of an active learning process using the music software Pro Tools and a digital PDF reader capable of playing the hyperlinked 'show-me' YouTube movie links. A digital version of the '*Boomacious*' instructional resource and movies can be found in DVD Appendix 52, or it may be downloaded from the Music Creation World website (http://www.musiccreationworld.com).

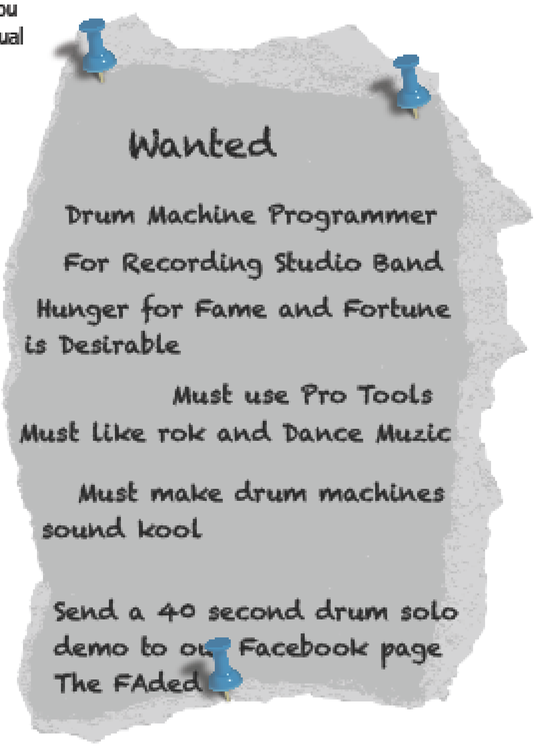
Introduction to Boomacious

Boomacious is a learning guide that will help you create MIDI based drum patterns using the virtual drum machine instrument, Boom.

Once you have created your patterns, you will assemble these into a short song using the music software Pro Tools. A process of guided exploration and discovery will assist you to develop software specific skills that will be applied in a creative way to demonstrate and further your own musical understanding.

This learning activity is designed for people with fundamental music technology skills and is suitable for individual instruction or for whole-class teaching within a secondary school.

What you need:
- Mac or PC computer with low latency audio interface
- Pro Tools 10.1
- Headphones
- optional MIDI keyboard
- optional iPad or Tablet style device for PDF reading and YouTube movie viewing



How to use Boomacious

Simply follow the numbered steps and as you become more confident with what you are doing, you may only need to read the bold instructions. If you need more information, read the longer explanation underneath, double check with the picture or maybe watch the "show me how" movie. There are challenges that encourage you to discover how to do specific things as well as explain or help another learner do them.

Remember to keep moving through the activity so you build up your skills and knowledge quickly. Your first drum patterns may sound similar to others but the quicker you move through the activity, the sooner you will have the skills and confidence to make your own unique drum beats.

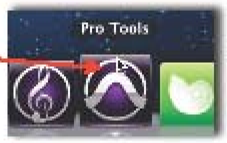
Boomacious

Part 1: Experimentation

1 A Creating The Project

http://youtu.be/5-wtUMizlUo

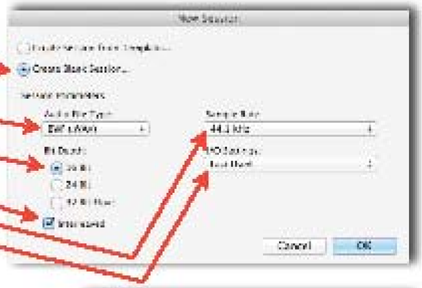
1. **Start Pro Tools**
   Move the pointer to the Dock and locate the Pro Tools shortcut. (Check the Applications Folder if it is not there.)

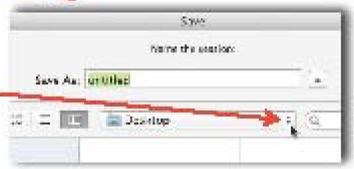


2. **Start New Session: File Menu>New Session**
   Move the pointer to the File Menu and select New Session. (Keyboard Shortcut (KS) is ⌘N)

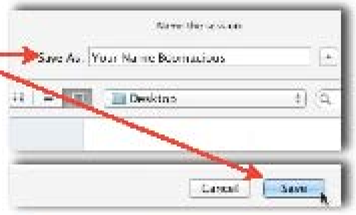
3. **Insert the following settings, then click OK**

Select:	*Create Blank Session*
Audio File Type:	*BWF (WAV)*
Bit Depth:	*16 Bit*
Interleaved:	*Tick*
Sample Rate:	*44.1kHz*
I/O Settings:	*Last Used*



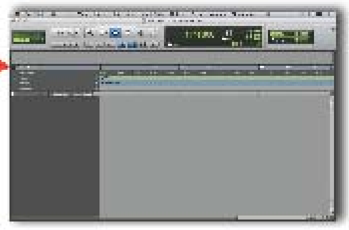


4. **Select a location to save your work**
   Select a location and folder to save your project session. (Use the default position or follow your teachers directions.)



5. **Name the Session 'Your Name Boomacious' and click Save**
   In the Save As window, type your name followed by Boomacious.

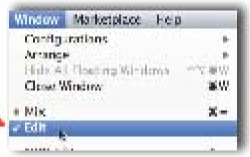
This will create a folder in the location you selected and this will contain all of the Boomacious session files.



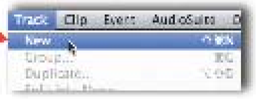
6. **Your desktop should resemble this.**
   If so proceed to step 8; if not, proceed to step 7.

Demonstration of EMDCARE and AID Plug In Learning Model

7. **Open Pro Tools Edit Window: Window>Edit**
Move the pointer to the Window menu and select Edit so that a tick is placed alongside the word Edit. Your desktop should now resemble step 6.



8. **Create a New Track: Track>New**
Move the pointer to the Track menu and select New.



9. **Insert the following settings, then click Create**

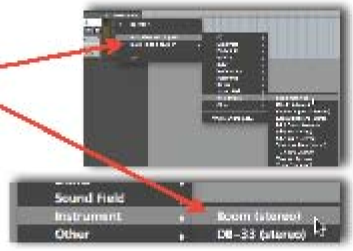
Create:	*1*
New:	*Stereo*
Track Type:	*Instrument Track*
In:	*Ticks*

10. **Open the Edit Window View selector**
Move the pointer to the Edit Window View icon to the upper left of the newly created track. Click on the View selector to open it.

11. **Activate only the following two View Columns: Inserts A-E and Track Colour**
Click on the View column names until ticks remain only with: Inserts A - E, Track Colour

12. **Open the Insert**
Move the pointer to the Grid Divider icon to the upper left of the newly created track. Click on the View selector to open it.

13. **Insert the Instrument 'Boom (stereo)'**
From the drop down list select:
Multichannel plug-in>Instrument>Boom (stereo)

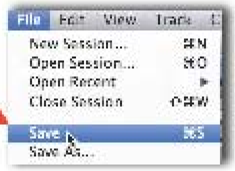


Demonstration of EMDCARE and AID Plug In Learning Model

14. **The Boom Instrument should now be visible.**

Before you explore the Boom drum instrument, we'll first save our ProTools session so that we can reload it should bad things happen or you run out of lesson time

15. **Save the Session: File>Save**
Move the pointer to the File menu and click Save...
If your are asked to overwrite the file, Click Yes.



1 B Experimentation Challenge 1

http://youtu.be/US_q4T2a1Uk

Through your own experimentation and exploration, find solutions to the following focus activity challenges. You may work together in pairs. Your teacher will set a time duration for this challenge.

1. **Click Play and seek solutions to the following challenges.**
Move the pointer to the Boom START button and click to start the sound. While the Drum machine is playing, seek solutions to steps 2-6.

2. **Demonstrate how you select different patterns.**

3. **Demonstrate how you select Preset styles.**

4. **Demonstrate how you change drum kits.**

5. **Demonstrate how you make the drum patterns faster and slower (adjust the tempo).**

6. **Select three drum patterns that you particularly like; play them to a friend and give at least two specific reasons why you like each pattern.**

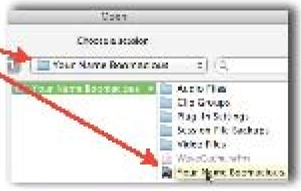
Part 2: Modification

http://youtu.be/b3ECb0QZS1s

2 A Open the Boomacious Session

1. **Start Pro Tools**
   Move the pointer to the Dock and locate the Pro Tools shortcut. (Check the Applications Folder if it is not there.)

2. **Open Session: File Menu>Open Session**
   Move the pointer to the File Menu and select Open Session. (Keyboard Shortcut (KS) is ⌘O)



3. **Locate the Boomacious session folder and open your session file.**
   Move the pointer to the location of your Boomacious session folder and then locate the file you titled 'Your Name Boomacious'. (Ask your teacher for help if you can not find the folder.)

4. **Your desktop should resemble this.**

2 B Modification Challenge 2

http://youtu.be/_2loQ6VhNo4

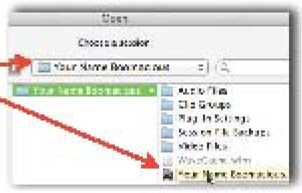
Through your own experimentation and exploration, modify the existing drum patterns and find solutions to the following focus activity challenges. You may work in pairs. Your teacher will set a time limit for this challenge.

1. **Click Start on Boom and seek solutions to the following challenges.**
   Move the pointer to the Boom Start button and click. While the Drum machine is playing, seek solutions to steps 2-8.
2. **Demonstrate how you activate the Pattern Edit Switch.**
3. **Demonstrate how you enter beats on the 1-16 timeline.**
4. **Demonstrate how you select different drum sounds and modify their beats.**
5. **Demonstrate how you mute (silence) a drum sound.**
6. **Demonstrate how you solo a drum sound.**
7. **Demonstrate how you copy a pattern.**
8. **Consider two reasons why you would copy patterns.**

Part 3: Deconstruction

3 A Open the Boomacious Session

http://youtu.be/0y7HeuvnNNE



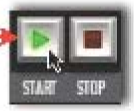
1. **Follow the steps described in section 2A to open your Boomacious Session.**
   - *File Menu>Open Session*
   - *Locate the Boomacious session folder*
   - *Open your session file*

http://youtu.be/maICAUyQazg

3 B Deconstructing a Patch

1. **Open the Boom Preset Librarian menu**
   Move the pointer to the Preset Librarian menu and click to open the menu.

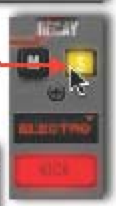
2. **Select Factory default**
   Move the pointer to the Factory default option and click to select.



3. **Click Play on the Boom Instrument**
   Move the pointer to the START button and click.

4. **Select Pattern 1**
   Move the pointer to the 1-16 timeline and click on number 1.

5. **Switch to Pattern Edit Mode**
   Move the pointer to the Edit Mode switch and select the lower PAT EDIT option.

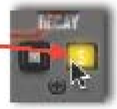


6. **Solo the Kick Drum while the pattern is playing**
   Move the pointer to the Kick Drum solo button and click so that it is highlighted.

7. **Change the Kick drum sound from Electro to Urban1 or any other kit that you like**
   Move the pointer to the KICK drum column and within the window with the name ELECTRO click on the drop down list icon (inverted triangle). Try several different kick drum kit styles until you find one that you like.

8. **Uncheck the Kick Solo to listen how the sound blends**
With the pattern still playing, move the pointer to the Kick Drum solo button and click so that it is no longer highlighted. Listen carefully to hear how well the sound blends with the other drum instruments. ***Repeat step 7 if you want to try a different Kick sound option.***

9. **Re-solo the Kick Drum while the pattern is playing**
Move the pointer to the Kick Drum solo button and click so that it is highlighted.



10. **Adjust the Kick Drum TUNING to your satisfaction**
Move the pointer to the Kick TUNE dial and *gradually adjust from maximum to minimum noting the change in sound. Select a value that creates the sound you like best.*

11. **Adjust the Kick Drum DECAY to your satisfaction**
Move the pointer to the Kick DECAY dial and *gradually adjust from maximum to minimum noting the change in sound. Select a value that creates the sound you like best.*

12. **Adjust the Kick Drum PANNING position to your satisfaction**
Move the pointer to the Kick PAN slider and *gradually adjust from Left to Right noting the change in sound position. Select a value that creates the sound you like best.*
A Kick Drum usually sounds best in the middle or centre. To return the slider to exactly centre, press the ALT/ Option key as you click on the PAN slider.

13. **Uncheck the Kick Solo to listen how the Kick Drum blends**
With the pattern still playing, move the pointer to the Kick Drum solo button and click so that it is no longer highlighted. Listen carefully to hear how well the sound blends with the other drum instruments.

14. **Adjust the Kick Drum volume LEVEL to your satisfaction**
Move the pointer to the Kick Drum LEVEL dial and *gradually adjust so that it balances with the other Drum instruments.*

3 C Construction Challenge 3

http://youtu.be/Si3yHUA0CdE

Use your deconstruction skills introduced in 3B steps 6-14 and select new instrument and sound settings for the instruments used in Pattern 1 . You may work in pairs. Your teacher will set a time limit for this challenge.

1. **KICK: Make the following adjustments to the KICK; instrument sound, tuning decay, panning and volume level.**

2. **SNARE: Make the following adjustments to the SNARE; instrument sound, tuning decay, panning and volume level.**

3. **CLOSED HiHat: Make the following adjustments to the Closed HiHat; instrument sound, tuning decay, panning and volume level.**

4. **CLAP: Make the following adjustments to the CLAP; instrument sound, tuning decay, panning and volume level.**

5. **CRASH CYMBAL: Make the following adjustments to the Crash Cymbal; instrument sound, tuning decay, panning and volume level.**

3 D Patterns and Variations

http://youtu.be/Bk81Iku4iRI

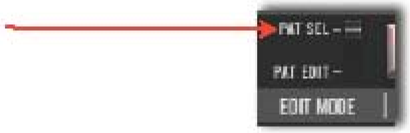
1. **Reset the Factory default Pattern styles to their default settings**
Move the pointer to the Preset Librarian menu and click to open the menu. Move the pointer to the Factory default option and click to select.

2. **Open the Setup window**
Move the pointer to the spanner icon located in the lower middle area and click.

3. **Activate PATTERN CHAINING**
Move the pointer to the BOOM SETUP window and select PATTERN CHAINING.
Click on the spanner icon to close the setup window.

4. **Click Play on the Boom Instrument**
Move the pointer to the START button and click.

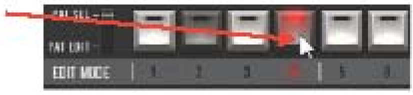
5. **Switch to Pattern Select Mode**
Move the pointer to the EDIT Mode switch and select the upper PAT SEL option.



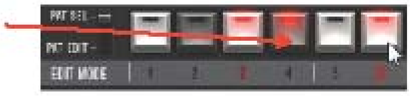
6. **Select Pattern 1**
Move the pointer to the 1-16 timeline and click on number 1.

7. **Chain together Patterns 1 and 2 and listen.**
Hold the Command key ⌘ while moving the pointer to pattern 2 and click to select. Patterns 1 and 2 should now play sequentially (one after the other).

8. **Release the Command key ⌘ and select Pattern 4**
Release the Command key ⌘ and move the pointer to pattern 4 and click to select. Only this pattern should play.



9. **Chain together Patterns 4, 3 and 6 and listen**
Hold the Command key ⌘ while moving the pointer to pattern 3 and click to select, Continue to hold the Command key ⌘ and also select pattern 6. The three patterns should now play sequentially in the order you selected them (4-3-6).



3 E Construction Challenge 4

Use your Pattern Chaining skills introduced in 3D steps 3-9 and select a combination of four or more patterns that chain together into a sensible musical phrase. You may work in pairs. Your teacher will set a time limit for this challenge.

1. **Create a four or 8 bar musical phrase by chaining together Patterns 1 to 16 in any combination and through listening and experimenting with various combinations of the Pattern order, decide what you think forms the best musical phrase.**

2. **Give at least two explanations why you like this pattern chain combination.**

3. **Play your chained pattern combination to another person and then explain to them why you like your pattern combination.**

4. **Listen to another persons Pattern Chain and provide them with feedback on what you liked and what you think could be improved.**

3 F Saving Your Own Pattern Preset

http://youtu.be/_SAOFjYmMVQ

All the changes you make to a rhythm pattern and it's instruments can be saved in the Library Preset folder for future use. If you do not save your Pattern work it will be lost when you change to another Library Preset or close your Pro Tools session. Construct your own self-titled Pattern Preset by following these guided steps.

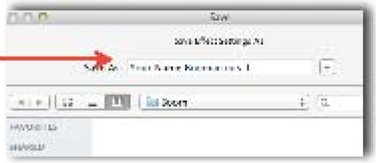
1. **Select either the Factory Default Pattern or any other Preset Pattern from the Library**
Move the pointer to the Preset Librarian menu and click to open the menu. Move the pointer to the either Factory default option or click on a Preset folder and click on one of the Pattern titles to select it. Preview the patterns if you wish.

2. **Open the Preset Settings Menu**
Move the pointer to the Preset Librarian Settings menu and click to open the menu.

3. **Select the Session Folder as the Location for saving User Preset Patterns**
Move the pointer to the Setting Preferences > then to Save plug-in Settings To >then select Session Folder

4. **Open the Preset Settings Menu and select: Save Settings As**
Move the pointer to the Preset Librarian Settings menu and click to open the menu and click on Save Settings As

5. **Type 'Your Name Boomacious 1' and click Save**
Move the pointer to the Save As window and type 'Your Name Boomacious 1' and then click Save.



6. **Open the Preset Librarian Menu**
Move the pointer to the Preset Librarian menu and then click to open.

7. **Navigate to the Sessions Settings Folder to see your Presets name.**

The Factory Default or other Preset we based the self titled pattern upon is still intact in it's original form but there is now a Session Pattern that can be altered and saved as required for future use in projects.

3 G Deconstructing a Pattern

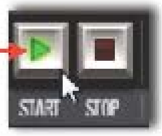
http://youtu.be/DvWOv6D6Em0

1. **Reset the Factory default Pattern styles to their default settings**
   Move the pointer to the Preset Librarian menu and click to open the menu. Move the pointer to the Factory default option and click to select.

2. **Switch to Pattern Select Mode**
   Move the pointer to the EDIT Mode switch and select the upper PAT SEL option.

3. **Select Pattern 1**
   Move the pointer to the 1-16 timeline and click on number 1.

4. **Click Play on the Boom Instrument**
   Move the pointer to the START button and click.



5. **Copy Pattern 1**
   Move the pointer to the Copy button above the pattern matrix and click. All timeline positions 2-16 will flash prompting you to make a choice.

6. **Paste to Pattern 2**
   Move the pointer to the timeline position 2 and click to paste the Pattern 1 settings.

7. **Copy Pattern 1 to Patterns 3, 4 and 5**
   Repeat steps 5 and 6 until the first 5 patterns are copies of Pattern 1.

8. **Select Pattern 1**
   Move the pointer to the 1-16 timeline and click on number 1.

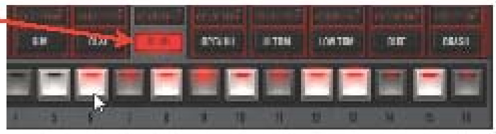
9. **Use the Pattern Matrix to remove the CRASH note on beat 4**
Move the pointer to the Pattern Matrix and click on the CRASH red dot located at beat 4 (the 13 position on the pattern grid) until it is no longer illuminated.

10. **Use the Pattern Matrix to remove the HI TOM note on beat 4.3**
Move the pointer to the Pattern Matrix and click on the HI TOM red dot located at beat 4.3 (the 15 position on the pattern grid) until it is no longer illuminated.

An alternative method to using the Pattern Grid for deleting rhythm notes is to use the Pattern Edit Mode and the instrument timeline 1-16

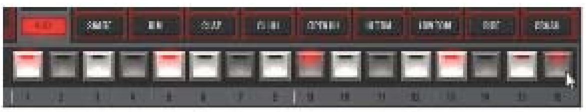
11. **Switch to Pattern Edit Mode**
Move the pointer to the Edit Mode switch and select the lower PAT EDIT option.

12. **Select the CL HH (Closed Hi Hat) instrument and delete all red rhythm indicators.**
Move the pointer to the CL HH instrument title and click to select it. Click on the red illuminated rhythm indicators on the Edit -16 timeline so that none are illuminated.



13. **Delete all other instrument rhythms leaving just the Kick drum on beats 1,2,3 and 4 (Edit timeline 1,5,9,13)**
Use either deletion method (3G steps 9 and 12) so that only the Kick drum rhythm indicators remain on the Pattern Matrix

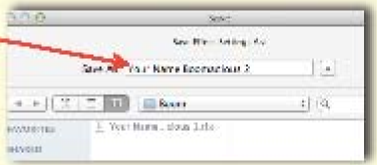
14. **Insert additional Kick rhythms on beats 4.3 and 4.4 (Edit timeline 15 and 16)**
With the pattern playing, select the Kick instrument and move the pointer to beat 4.3 (timeline 15) and click 3 times. Then move the pointer to beat 4.4 (timeline 16) and click 2 times. This will increase or decrease the velocity or volume of the note so that a gradual increase in volume (crescendo) is heard as the pattern loops.



Time To Save It is important to regularly save computer based work. The pattern that you are currently deconstructing is saved within the instrument Preset Settings of the Virtual Instrument Boom, not as a Pro Tools session. Assuming you have correctly followed Steps 3F, Saving this current pattern should be straight forward.

i. **Open the Preset Settings Menu of Boom and select: Save Settings As**
Move the pointer to the Preset Librarian Settings menu and click to open the menu and click on Save Settings As

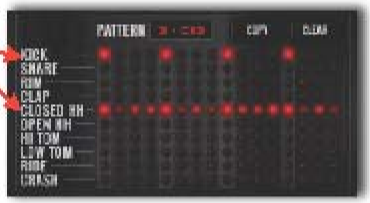
ii. **Type 'Your Name Boomacious 2' and click Save**
Move the pointer to the Save As window and type 'Your Name Boomacious 2' and then click Save.



15. **Switch to Pattern Select Mode and select Pattern 2**
Move the pointer to the EDIT Mode switch and select the upper PAT SEL option. Then move the pointer to the 1-16 timeline and click on number 2.

16. **Switch back to Pattern Edit Mode**
Move the pointer to the Edit Mode switch and select the lower PAT EDIT option.

17. **Leaving the Kick and Closed Hi Hat, delete all other Instrument rhythms for Pattern 2**
Use either deletion method (3G steps 9 and 12) so that only the KICK and CLOSED HH rhythm indicators remain on the Pattern Matrix.

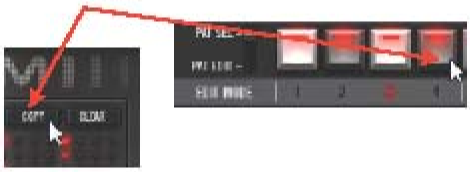


18. **With the pattern playing, change the velocity or volume of the Closed Hi Hat rhythms as well as delete some rhythm indicators for added interest.**
Ensure the pattern is playing, select the CLOSED HH instrument and either on the Matrix or Edit Timeline, experiment with placing different velocity notes (darker and lighter red notes) on the timeline. Try leaving some silences (black dots) for added variety.

19. Switch to Pattern Select Mode and select Pattern 3
Move the pointer to the EDIT Mode switch and select the upper PAT SEL option. Then move the pointer to the 1-16 timeline and click on number 3.

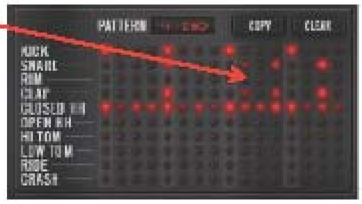
20. Use the Pattern Matrix and Delete all other sounds so that only the KICK, CLOSED HH, SNARE and CLAP remain.
Move the pointer to the Pattern Matrix and click on the red rhythm indicators for all the instruments not listed above. The completed Matrix should resemble this picture.

21. Copy Pattern 3 to Pattern 4.
Move the pointer to the Pattern Matrix copy button and click. Move the pointer to the flashing timeline position 4 and click to paste the Pattern 3 settings

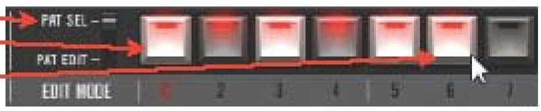


22. Place in the following Syncopated Snare and Clap rhythms.
Use either the Pattern Matrix or the Pattern Edit Timeline. The completed Matrix should resemble this picture.

- **Beat 3-2 (number 10) 3 clicks (lowest velocity - soft)**
- **Beat 3-4 (number 12) 2 clicks (middle velocity- louder)**
- **Beat 4-3 (number 15) 1 click (highest velocity – loudest)**



23. Chain Patterns 1 to 6 sequentially and as it plays, listen for the gradual increase in complexity.
- *Move the pointer to the EDIT MODE and select PAT SEL mode (Pattern Select).*
- *Move the pointer to Pattern 1 and click.*
- *Hold the Command key ⌘ while moving the pointer to Pattern 2 and click, then repeat for 3,4,5 and 6.*



<u>Time To Save</u>

It is important to regularly save computer based work. The pattern that you are currently deconstructing is saved within the instrument Preset Settings of the Virtual Instrument Boom, not as a Pro Tools session. Assuming you have correctly followed Steps 3F, Saving this current pattern should be straight forward.

i. **Open the Preset Settings Menu of Boom and select:**
Save Settings As
Move the pointer to the Preset Librarian Settings menu and click to open the menu and click on Save Settings As

Part 4: Construction

It is now time to construct your own instrument and patterns applying the knowledge and skills you have just learnt.
A number of focus activities are suggested. These can be performed in any order and repeated until you are satisfied that your drum kit and patterns are musically successful.
Save the Pattern in the Boom Pattern Library as you will use this for your own 'audio mix' in the Application section.

4 A Focus Activities

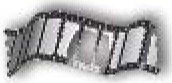
http://youtu.be/ruccOX-tVdY

1. **Create a single drum kit pattern that contains a range of instrument sounds from various kits.**
2. **Adjust the tuning, Decay, Pan and Level parameters for each instrument sound so that their volumes are balanced.**
3. **Create a series of patterns that gradually increase in rhythmic complexity and sound musically sensible.**
4. **Chain Patterns together and listen to evaluate how successful the increasing complexity is.**
5. **Save the Pattern as Boomacious 3 in the Pattern Library.**
6. **Play your Boomacious Pattern 3 to another person and ask them for feedback regarding what they liked and what they thought could be improved.**
7. **Revisit any of the above focus activities if you think you can improve the instrument sounds or the pattern complexity.**
8. **Listen to another persons Boomacious Pattern 3 and provide them with feedback on what you liked and what you think could be improved.**

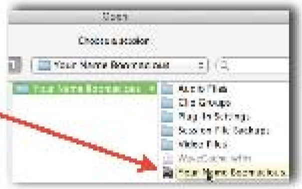
Part 5: Application

It is now time to record an extended combination of Boomacious drum patterns onto their own MIDI track. You will create a short 40 second drum recording that should contain some structure, development introduction, verse and chorus.
This will require some patterns to repeat while others may only be used sparingly. You will decide the best order.
When you are satisfied with the combination, you will create a 'bounced' audio recording of the drum pattern MIDI track.

5 A Preparing to Record



http://youtu.be/jRH6yNrKB30



1. **Open your Pro Tools Boomacious Session.**
   - *Start Pro Tools*
   - *File Menu>Open Session*
   - *Locate the Boomacious session folder*
   - *Open your session file 'Your Name Boomacious'*

2. **Load the 'Boomacious 3' drum patterns into Boom.**
   - **Ensure Boom is open on your Edit Window**
     Move the pointer to the "Inserts A-E" and click on the Boom button so that it is highlighted.
   - **Open the Preset Librarian Menu**
     Move the pointer to the Preset Librarian menu and then click to open
   - **Navigate to the Sessions Settings Folder and select 'Boomacious 3'**

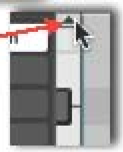
3. **Resize the 'Inst 1' track height to Jumbo**
   - **Open 'Inst 1' track options.**
     Move the pointer to the 'Inst 1' track and in the upper right corner, click on the inverted triangle.
   - **Select Jumbo..**
     A drop down menu will appear and click the pointer on the Jumbo option

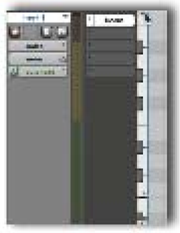
4. **Select 'Inst 1' Track Notes view.**
   - **Open 'Inst 1' Track View selector.**
     Move the pointer to the 'Inst 1' track view selector located beneath the Record, Solo and Mute buttons and and click on the rectangle
   - **Select Notes..**
     A drop down menu will appear and click the pointer on the Notes option

5. **Increase the size of the Notes view keyboard so that position C3 is at the lower edge.**

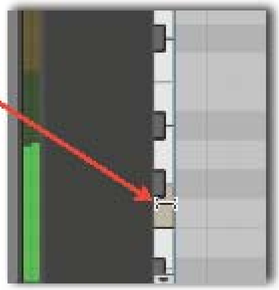
- **Increase the 'MIDI Zoom In' size to maximum.**
  Move the pointer to the "MIDI Zoom In' button located on the middle left edge of the Edit Window and click several times on the upper edge of the button to maximize the size of the Notes View keyboard.

- **Scroll up to position the C3 key at the lower edge**
  Move the pointer to the 'Inst 1' keyboard scroll up button located next to the Insert name Boom. Click several times until the C3 key is on the lower edge of the track lane.
  Note: you may need to use the Down scroll button if you only see numbers greater than 3.

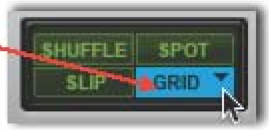




6. **Preview your Boomacious Drum patterns using the Notes Track View keyboard from C3 upwards.**
Move the pointer to the 'Inst 1' - Notes Track View keyboard and click hold on the key labelled C3. Then gradually slide up to preview more patterns
Note: There is a link between the Boom 1-16 Pattern numbers and the Notes Track View keyboard.



7. **Select the Grid edit mode.**
Move the pointer to the Edit Mode buttons on the top toolbar and click on Grid.



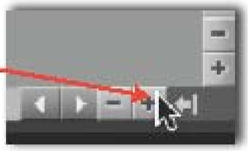
8. **Select the Smart Tool.**
Move the pointer to the Edit tools and click on the top border surrounding the hand grabber tool. This will select two other tools.

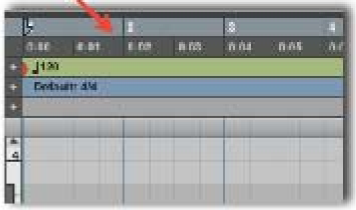
9. **Select Show Grid Lines**
Move the pointer to the Grid and Nudge value window and click on the word Grid so that it is highlighted.

10. **Set Grid value to Quarter Note.**
Move the pointer to the note value alongside the word 'Grid'. Click on the note and select Quarter note from the dropdown menu.

11. **Return the Play Timeline to Zero.**
Move the pointer to the Transport and click on the 'Return to Zero' button located on the lower left edge of the transport.

12. **Show individual Bar numbers in the Timeline ruler by adjusting the Edit Window Zoom value.**
Move the pointer to the Edit Window Zoom buttons located on the lower right corner of the Edit Window. Click on the plus and minus buttons until the Timeline ruler shows individual bars with the quarter note grid division.





Your Edit Window should now resemble this.

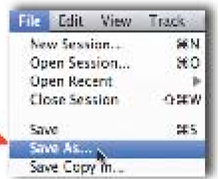
13. **Save the Pro Tools Session as .. 'Your Name Boomacious 2'**

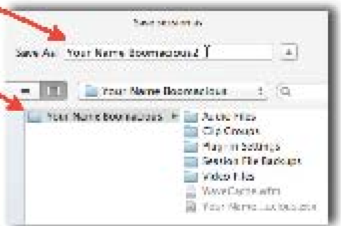
- **File>Save As**
Move the pointer to the File menu and select Save As...

- **Type 'Your Name Boomacious 2'**
In the 'Save Session As' window, move the pointer to the 'Save As' field and type 'Your Name Boomacious2'.

- **Check that you are saving to the Boomacious session folder**
If the location is not correct, move the pointer to up and down arrows and navigate to the correct location.

- **Press Save**





http://youtu.be/ovCuRdCnmpM

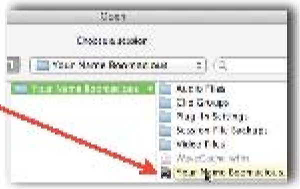
5 B Record using Pencil Tool (Manual MIDI Record)

1. **Open the 'Your Name Boomacious 2' session if it is not already open.**

   • **Open Session: File Menu>Open Session**
   Move the pointer to the File Menu and select Open Session. (Keyboard Shortcut (KS) is ⌘O)

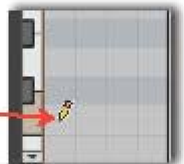
   

   • **Locate the Boomacious session folder and open your session file.**
   Move the pointer to the location of your Boomacious session folder and then locate the file you titled 'Your Name Boomacious2'. (Ask your teacher for help if you can not find the folder.)

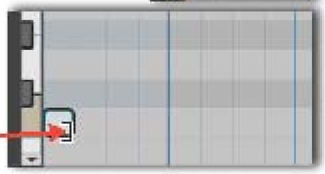
   

2. **On the Boom track view, draw a MIDI note on C3 starting from bar 1 until the end of bar 2**

   • **Hold the modifier key Control (Mac)/Start (Win) and move pencil tool to C3 bar 1 beat 1 and click.**
   Move the pointer to the Boom MIDI track and press/hold the modifier keys Control (Mac)/Start (Win). A pencil tool will appear. Position the pencil tool at bar 1 beat 1 and click.

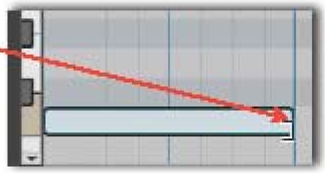
   

   A MIDI note appears

   • **Release modifier keys, move pointer to end of MIDI note. A trimmer tool appears**

   • **Click hold and drag the trimmer tool to the end of bar 2.**
   Release any held modifier keys, move the trimmer tool to end of the MIDI note, click hold and drag the MIDI note until the end of Bar 2 (the line of Bar 3 beat 1) and release.

3. **Press Play on the Transport and listen.**

   • **Return the Play Timeline to zero.**
   Move the pointer to the Transport and click on the 'Return to Zero' button located on the lower left edge of the transport.

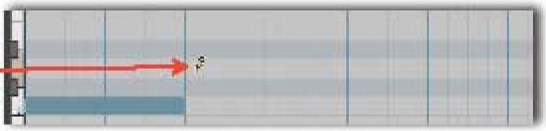
   

   • **Click on Play.**
   Move the pointer to the Transport and click on the 'Play' button, the Green arrow located on the upper right of the Transport.

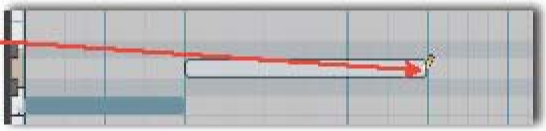
   

4. **Draw in a different 3 bar MIDI note (possibly D3) starting from bar 3 beat 1.**

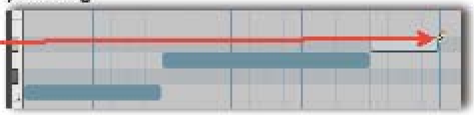
   - *Hold the modifier key Control (Mac)/ Start(Win) and move the pencil tool to D3 bar 3 beat 1 and Click/Hold.*



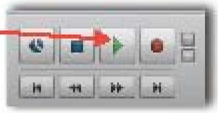
   - *Drag the Pencil tool until the end of bar 5 (start of bar 6 beat 1)*



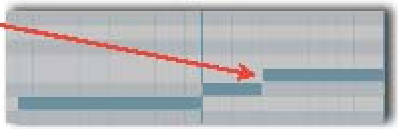
5. **Draw in a different 1 bar MIDI note (possibly D#3) starting from bar 6 beat 1.**
   Hold the modifier key and Click/Hold/Drag the pencil tool from D#3 bar 6 beat 1 to the end of bar 6 (start of bar 7 beat 1)



6. **Press Play on the Transport and listen.**
   Return the Play Timeline to zero and click on Play.

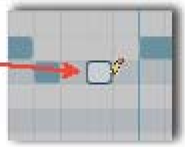


7. **Draw in a different 2 bar MIDI note (possibly E3) starting from bar 7 beat 1.**
   Hold the modifier key and Click/Hold/Drag the pencil tool from D#3 bar 6 beat 1 to the end of bar 7 (start of bar 8 beat 1).

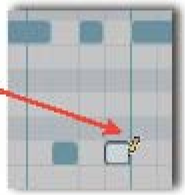


To create further variation and phrasing within the drum pattern manual recording, try these advanced arranging techniques for inserting beat silence as well as changing patterns within a bar.

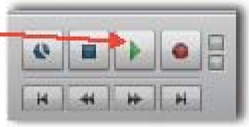
8. **Beat Silence**
   Use a different pattern (possibly D#3), draw in a 1 beat MIDI note on bar 9 beat 1 and again at bar 9 beat 3. Leave beats 2 and 4 blank.



9. **Switching Patterns in Bars**
   Use two different patterns (possibly E3 and C3)
   - *Using the first pattern, draw in a 1 beat MIDI note on bar 10 beat 1 and again at bar 10 beat 3.*
   - *Using the second pattern, draw in a 1 beat MIDI note on bar 10 beat 2 and again at bar 10 beat 4.*

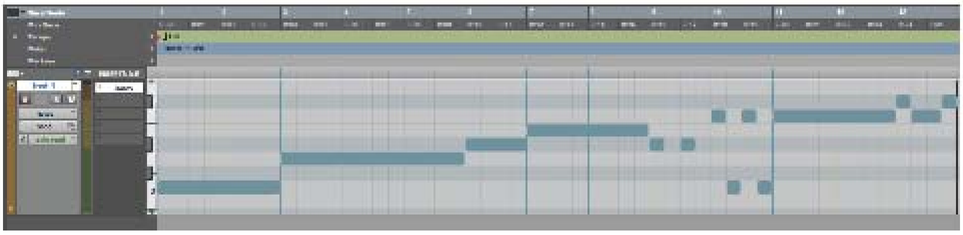


10. **Press Play on the Transport and listen.**
    Return the Play Timeline to zero and click on Play.

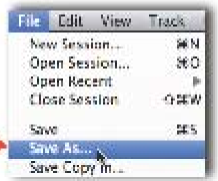


Use the above techniques to assemble a drum track recording that lasts for approximately 40 seconds. Please check the evaluation criteria to ensure you have included all of the performance and editing skills.

11. **Your completed recording may resemble this.**

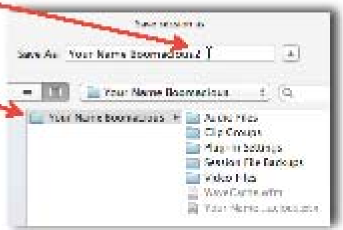


12. **Save the Pro Tools Session as .. 'Your Name Boomacious 3'**



- **File>Save As**
  Move the pointer to the File menu and select Save As...

- **Type 'Your Name Boomacious 3'**
  In the 'Save Session As' window, move the pointer to the 'Save As' field and type 'Your Name Boomacious3'.



- **Check that you are saving to the Boomacious session folder**
  If the location is not correct, move the pointer to up and down arrows and navigate to the correct location.

- **Press Save**

5 C Adding Crash Cymbals and other Sounds

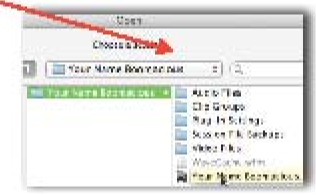
http://youtu.be/7zaCPpQdsuo

Additional musical interest can be added to this electronic drum track by adding cymbal accents to the beginning of musical sections. Follow these steps to learn how to add additional instrument sounds and personalize your electronic drum solo with your own tasteful additions.

1. **Open the 'Your Name Boomacious 3' session if it is not already open.**

   - **Open Session: File Menu>Open Session**
     Move the pointer to the File Menu and select Open Session. (Keyboard Shortcut (KS) is ⌘O)

   - **Locate the Boomacious session folder and open your session file.**
     Move the pointer to the location of your Boomacious session folder and then locate the file you titled 'Your Name Boomacious3'. (Ask your teacher for help if you can not find the folder.)

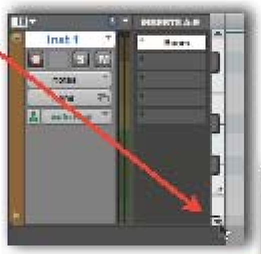


2. **Resize the 'Inst 1' track height to Jumbo**

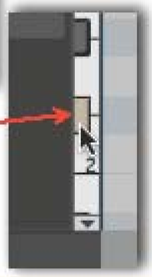
   - **Open 'Inst 1' track options.**
     Move the pointer to the 'Inst 1' track and in the upper right corner, click on the inverted triangle.

   - **Select Jumbo..**
     A drop down menu will appear and click the pointer on the Jumbo option

3. **Scroll down and locate C2 on Boom track**
   Move the pointer to the 'Inst 1' keyboard scroll down button located next to the Insert name Boom. Click several times until the C2 key is on the lower edge of the track lane.
   Note: you may need to use the Up scroll button if you only see numbers less than 2.



4. **Locate C#2 (crash cymbal)**
   Move the pointer to the C#2 black key and click on the instrument to hear the electronic crash cymbal sound.

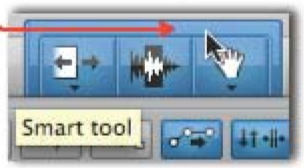


5. **Play the C#2 (crash cymbal) and check Boom instrument**
Move the Boom instrument so that you can see the Crash instrument upper red activity light flash when you click on the C#2 key.

6. **Select the URBAN 1 Crash instrument**
Move the pointer to the BOOM - CRASH instrument column and click on the title ELECTRO and select URBAN 1 from the drop down list.

7. **Increase the Decay to full and retune the Crash cymbal while clicking on the C#2 key**
Move the pointer to the CRASH instrument DECAY dial and increase the decay to full (5 o'clock). Move the pointer to the TUNE dial and raise or lower the cymbal pitch to suit your sonic preference.

8. **Select the Smart Tool**
Move the pointer to the Edit tools and click on the top border surrounding the hand grabber tool. This will select two other tools.



9. **Open the Show Hide automation lanes for the Inst 1 track.**
Move the pointer to the lower left corner of the Inst 1 track and click on the arrow head. An automation lane view will open.

10. Select Velocity within the Lane view selector

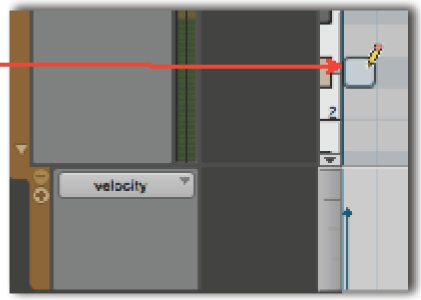
Move the pointer to the Lane view selector and click on the triangle and select 'Velocity'.

11. Return the timeline to zero.

Move the pointer to the transport control and click on the lower left button 'Return to Zero'.

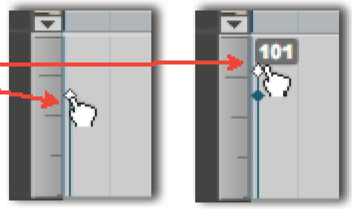
12. Draw in a Cymbal Crash at beat 1.1

Hold the modifier key Control (Mac) / Start (Win) and move the pencil tool to C#2 bar 1 beat 1 and Click.



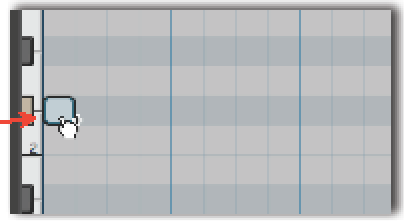
13. Click on the velocity lane triangle and drag up to approximately 100.

Move the pointer to the automation lane beneath the created note and Click/Hold and drag the velocity line from 80 to approximately 100.

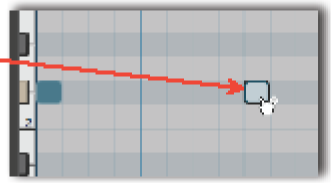


14. Click and drag/copy the Crash MIDI note to beat 3.1.

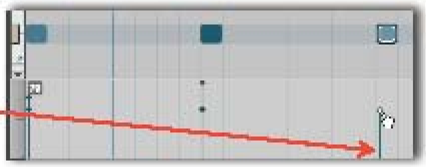
- **Hold the modifier Option/Alt key and Click/Hold the Crash MIDI note.**
  Press and hold the modifier key Option (Mac) / Alt (Win) and move the pointer to the 'Inst 1' track and Click/Hold the C#2 MIDI note at beat 1.1.



- **Drag/Copy to beat 3.1**
  Holding the modifier key, Click/Hold and drag-copy the C#2 note to beat 3.1.



15. **Adjust the velocity of this drag copied note and repeat the process for another crash cymbal note two bars later (bar 5.1)**



16. **Place additional crash cymbal sounds at positions you deem to be effective.**

17. **Your completed song may look something like this,**

18. **Listen to your electronic drum track.**

- **Return the Play Timeline to zero.**
  Move the pointer to the Transport and click on the 'Return to Zero' button located on the lower left edge of the transport.

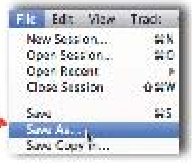
- **Click on Play.**
  Move the pointer to the Transport and click on the 'Play' button, the Green arrow located on the upper right of the Transport.

Why not make some improvements to your electronic drum piece? These improvements could include:
- selecting new instrument sounds within Boom
- inserting extra rhythm beats
- adjusting crash cymbal velocities
- Inserting additional drum instrument sounds such as Toms, Claps,etc.

When you are satisfied with the improvements you have made, proceed to step 19 and save your work.

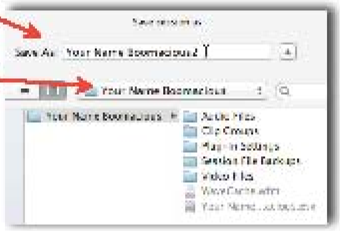
19. **Save the Pro Tools Session as .. 'Your Name Boomacious 4'**

- **File>Save As**
  Move the pointer to the File menu and select Save As...



- **Type 'Your Name Boomacious 4'**
  In the 'Save Session As' window, move the pointer to the 'Save As' field and type 'Your Name Boomacious2'.

- **Check that you are saving to the Boomacious session folder**
  If the location is not correct, move the pointer to up and down arrows and navigate to the correct location.



- **Press Save**

5 D Mix Down (Bounce to Disk)

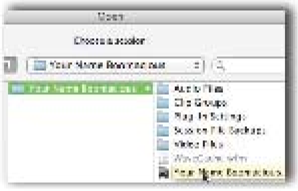
http://youtu.be/Jn4CffmS6XU

A Mix Down is a process where the recordings we have made are blended together into an audio format that is playable across different computer formats and devices. Pro Tools calls this 'Bouncing to Disk' and as we have not used any more than one instrument track it is a straight forward process. Complete the following steps so that you and your friends can play your completed electronic drum solo across a range of devices.

1. **Open the 'Your Name Boomacious 4' session if it is not already open.**

   • **Open Session: File Menu>Open Session**
   Move the pointer to the File Menu and select Open Session. (Keyboard Shortcut (KS) is ⌘O)

   • **Locate the Boomacious session folder and open your session file.**
   Move the pointer to the location of your Boomacious session folder and then locate the file you titled 'Your Name Boomacious4'. (Ask your teacher for help if you can not find the folder.)

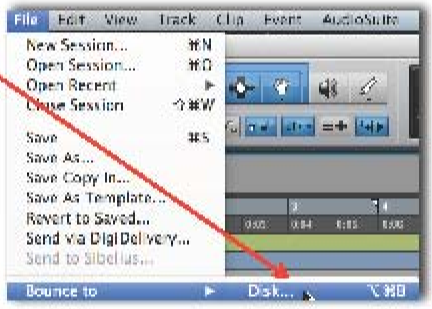


2. **Turn off the following settings.**
   The following should not have been turned on but just in case your exploring did manage to switch then on:

   • **Turn off the 'Inst 1' record enable.**
   Move the pointer to the far left button beneath the Inst 1 track name and click on the button so that is not flashing red.

   • **Turn off the Metronome.**
   Locate the MIDI Controls on the Task Bar and click the pointer on the Metronome button so that it is grey.

3. **File Menu>Bounce to Disk.**
   Move the pointer to the File Menu and select Bounce to Disk

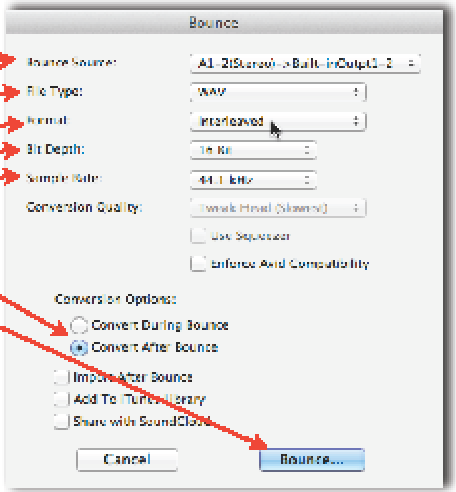


4. Select the following settings and then click Bounce.

Bounce Source: *A 1-2 stereo*
File Type: *WAV*
Format: *Interleaved*
Bit Depth: *16*
Sample Rate: *44.1kHz*

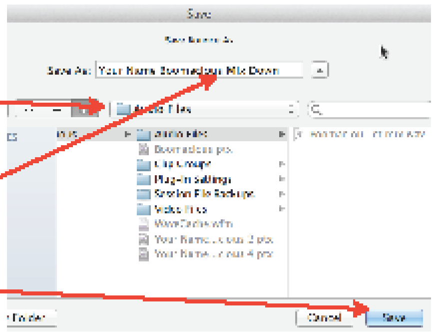
Convert After Bounce

Click Bounce



5. Save Bounce As.

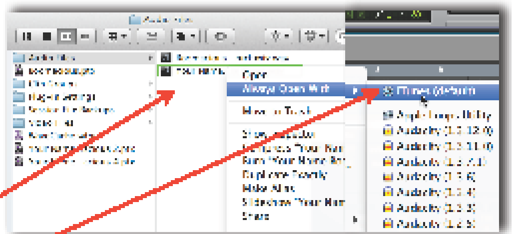
- *Check you saving location. Place the bounce mix into the Boomacious Session Audio Files folder*
- *Create a file name for the audio file "Your Name Boomacious mix down"*
- *Click SAVE*



6. Check that it plays back using iTunes .

To check if the 'mix down' / 'bounce' process worked correctly:

- Open a new browser window
- Navigate to the desktop where the current Pro Tools session folder is located
- Navigate to the Audio Files folder and there you should find your name
- Right click on the file and select 'Open With'
- Choose iTunes Player or some other device



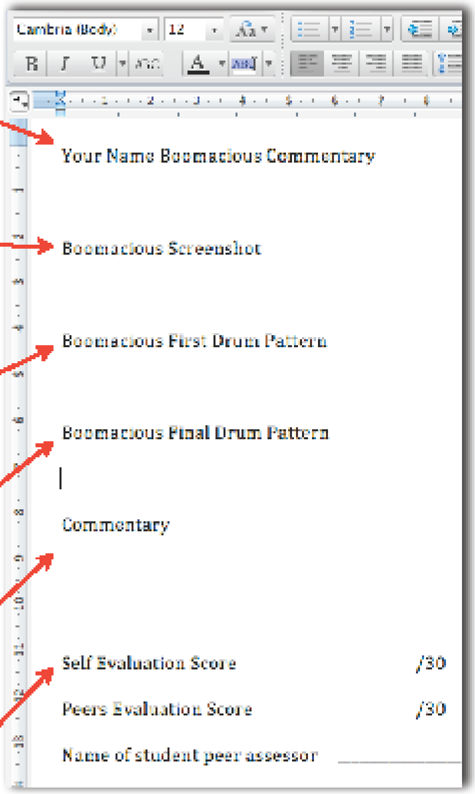
Part 6: Reflection

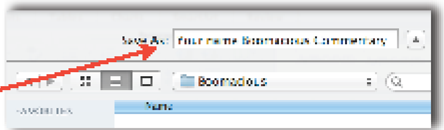
An important process in music creation is critically appraising your own work and that of others. You can do this by reflecting upon the new music technology skills you have learnt in this activity and then consider how well you think you have succeeded in performing those steps.
You will firstly create an evaluation commentary document, then take three screenshots of your Boomacious recording and finally, complete a self and peer evaluation based upon your Boomacious recording.

6 A Preparing Evaluation Commentary

http://youtu.be/tJrqhgaqOFw

1. **Create a new word processing document**
   Use Word or Pages software.
2. **Type the heading:**
   Your Name - Boomacious Commentary
3. **Insert several blank lines (press the return key)**
4. **Type the heading:**
   Boomacious Screenshot
5. **Insert three more blank lines**
6. **Type the heading:**
   Boomacious First Drum Pattern
7. **Insert three more blank lines**
8. **Type the heading:**
   Boomacious Final Drum Pattern
9. **Insert three more blank lines**
10. **Type the heading:**
    Commentary
11. **Insert three more blank lines**
12. **Type the following:**
    Self Evaluation Score /32
    Peers Evaluation Score /32
    Name of student peer assessor
13. **Save your word processing document as:**
    Your Name Boomacious Commentary





6 B Screenshot Capture

http://youtu.be/Jn4CffmS6XU

Screenshots provide a simple method for displaying our computer work within a printed document. We will take three screenshots of our Boomacious drum project and paste each into our evaluation commentary.

1. A desktop picture showing most of our editing and recording.
2. The first Boomacious drum pattern used within Boom
3. The final Boomacious drum pattern used within Boom.

1. Open the Pro Tools Boomacious 4 session and load the Boomacious 3 drum patterns in to the Boom instrument.
Follow steps 5A 1 and 2 to open the Boomacious session 4 session and Boom instrument drum patterns Boomacious 3.

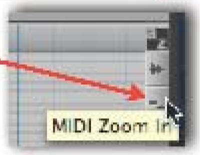
2. Close the Boom instrument.
Move the pointer to the close window button top left of the Boom drum machine and click or, within the INSERTS column click on the name Boom.

3. Select Notes view in the Track View Selector

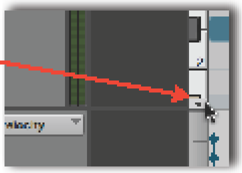
4. Show the Velocity automation lane
Move the pointer to the lower left corner of the Inst 1 track and click on the arrow head. An automation lane view will open.

5. Resize the track height to fill the display screen
Move the pointer to the line above the automation lane, click hold and drag the dividing line cursor downwards until the automation lane touches the bottom of the screen.

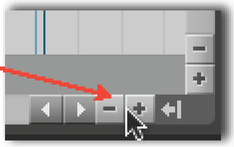
6. Increase the size of the Notes view keyboard setting 'MIDI Zoom In' size to maximum.
Move the pointer to the "MIDI Zoom In' button located on the middle left edge of the Edit Window and click several times on the upper edge of the button to maximize the size of the Notes View keyboard.



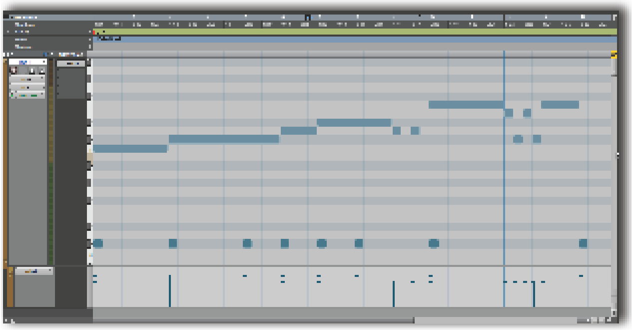
7. **Scroll down to position the C2 key at the lower edge**
Move the pointer to the 'Inst 1' keyboard scroll down buttons. Click several times until the C2 key is on the lower edge of the track lane.
Note: you may need to use the Up scroll button if you only see numbers greater than 3.



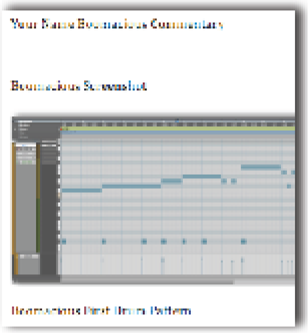
8. **Use the Horizontal window zoom to show all notes**
Move the pointer to the lower right portion of the screen and use the four horizontal controls to position all notes within the track window.



9. **Your desktop should look something like this**



10. **Take a desktop screenshot**
For a Mac, press and hold the following three keys: Command, Control, Shift and then press the 3 key.
For a PC, press Print Screen



11. **Paste the screenshot into the evaluation document beneath Boomacious Screenshot**
Move the cursor to the Word/Pages document and click below the heading Boomacious Screenshot. To paste press **⌘V** (Mac) or ***Ctrl V*** *(PC).*

12. **In Pro Tools, open the BOOM instrument and select your first Boomacious drum pattern.**
Move the cursor to the Word/Pages document and click below the heading Boomacious Screenshot. To paste press **⌘V** (Mac) or ***Ctrl V*** *(PC).*

13. **Take a desktop screenshot**
For a Mac, press and hold the following three keys: Command, Control, Shift and then press the 3 key.
For a PC, press Print Screen

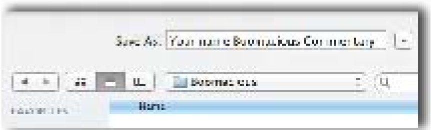
14. **Paste the screenshot into the evaluation document beneath Boomacious First Drum Pattern.**
Move the cursor to the Word/Pages document and click below the heading Boomacious First Drum Pattern. To paste press **⌘V** (Mac) or ***Ctrl V*** *(PC).*

15. **In Pro Tools, open the BOOM instrument and select your final Boomacious drum pattern.**
Move the cursor to the Word/Pages document and click below the heading Boomacious Screenshot. To paste press **⌘V** (Mac) or ***Ctrl V*** *(PC).*

16. **Take a desktop screenshot**
For a Mac, press and hold the following three keys: Command, Control, Shift and then press the 3 key.
For a PC, press Print Screen

17. **Paste the screenshot into the evaluation document beneath Boomacious Final Drum Pattern.**
Move the cursor to the Word/Pages document and click below the heading Boomacious Final Drum Pattern. To paste press **⌘V** (Mac) or ***Ctrl V*** *(PC).*

18. **Save your word processing evaluation commentary as: Your Name Boomacious Commentary**

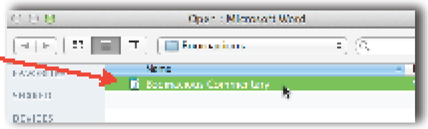


6 C Evaluation

http://youtu.be/Jn4CffmS6XU

An important process in marking or evaluating musical work is for the person who created the music to explain what is important in their music. Using the assessment document you created in step 6A, complete the following steps.

1. **Open the Boomacious Commentary word processing document**
   Use Word or Pages software.



2. **Move the cursor to the line underneath the heading Commentary**

3. **In six paragraphs (approximately 200 words) provide at least 3 valid points for the following question headings:**

   1/ What was the intention of the music?

   2/ What editing devices did you use?

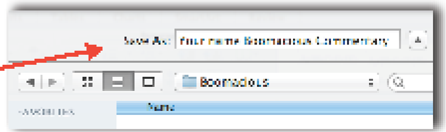
   3/ What musical arranging devices were used?

   4/ Describe the various sections of the music

   5/ Which section do you think sounds the best and why?

   6/ How could this music be improved?

4. **Save your Boomacious Commentary.**



5. **Use the following Evaluation Rubric to grade your work. You may choose to print this page and submit it to your teacher.**
   - **Read the descriptors in the grey boxes**
   - **Identify the assessment devices**
   - **Listen closely to your Boomacious mix down and then decide which descriptor score matches your work**
   - **When you have decided upon a Total Score, enter your score intro your Evaluation Commentary**
   - **Select another student to be your Peer Assessor and have them listen to your mix down and read your commentary.**
   - **Write their name and record their mark in your commentary document**
   - **Save your Boomacious Commentary**

EVALUATION RUBRIC			
(score)	2	1	0
Activity Tasks	Content is evident and musically effective	Content is evident but not musically effective	Content is not evident
Variety of Instrument Sounds	/2 (score)		
Panning of Instruments	/2 (score)		
Instrument Tuning	/2 (score)		
Instrument Volumes Balanced	/2 (score)		
Structure or Form (Sections)	/2 (score)		
Increasing Rhythmic Complexity in Patterns	/2 (score)		
Additional Sounds (e.g. crash cymbals)	/2 (score)		
Beat Silence (e.g. contrasting silence)	/2 (score)		
Mix Down (Bounce to Disk)	Plays well. Stereo image is evident.	Plays well. but volume level is clipping and sounds distorted	Not submitted in stereo interleaved format or does not play.
Bounce to stereo interleaved wave file	/2 (score)		
Personal Commentary	Three or more valid points are discussed	One or two valid points are discussed	Inaccurate or not attempted
1/ Intention	/2 (score)		
2/ Editing Devices	/2 (score)		
3/ Arranging Devices	/2 (score)		
4/ Section Descriptions	/2 (score)		
5/ Best Bits and Why	/2 (score)		
6/ Improvements	/2 (score)		
7/ Screenshots	/2 (score)		
Total Score			
Self Assessment	/32		
Peer Assessment	/32		
Name of Peer Assessor			

6 D Submitting Work

The Evaluation Commentary and the Boomacious Mix Down should be submitted to your teacher for feedback and to confirm your self and peer assessed scores. Follow your teacher's directions for submitting work.

Part 7: Extension

It is now time to create your own electronic drum solo without any guided instructions. Use the music technology recording and editing techniques from this Boomacious music creation activity and explore your own musical tastes and styles. A list of suggested music technology techniques is included below but do not limit yourself to just these suggestions.

When you have completed your work, you should take a screenshot of your session, bounce your mix to disk and write a 150 word commentary explaining your composition. Submit the extension work to your teacher ready for uploading to the class Hall of Fame blog for student and community listening.

1. **Suggested Musical Techniques**

- Piece duration - 1 to 2 minutes
- Structural form (Intro - Verse - Chorus)
- Increasing rhythmic complexity
- Layering of instruments
- A range of volume dynamics
- Cymbal accents at beginnings of sections
- additional MIDI recorded instrumental sounds
- Range of electronic drum sounds
- Balancing the instrument volumes
- Panning Instruments to create stereo image
- Textural Contrast (less instruments)
- Beat Silence

2. **Bounce to Disk**

- Stereo interleaved wave file

3. **Commentary Document**

- Creation of a word processing document to contain the commentary explanation and screenshot (Word or Pages)

4. **Screenshot**

- Image of Pro Tools session project showing MIDI recording and velocity automation
- Additional Boom instrument patterns that you are proud of and want to explain in the commentary

5. **Commentary Explanation**

- What was the intention of the project?
- What editing devices did you use?
- What musical arranging devices were used?
- Describe the various sections of the music
- Which section do you think sounds the best and why?
- If you had more time, how could this music be improved?

6. **Submitting Extension Work**

- Your extension project wave file and commentary should be submitted to your teacher ready for uploading to the class Hall of Fame Blog

Teacher's Notes

This Boomacious learning activity serves as both a practical instructional resource for secondary school Music ICT as well as being a demonstration model for a constructivist influenced Music ICT Learning Framework and instructional design model. Boomacious provides the perfect solution for educators seeking structured and guided learning tasks suited to the dynamic environment of a school classroom. The activity can be adjusted to suit your preferred teaching style as well as the breadth of learning styles likely in a classroom setting.

The can be used as an 'all-in-one' learning activity with instruction and assessment, however, students are likely to achieve a higher level of engagement and a deeper understanding of the musical and technical skills if they are involved in a range of learning experiences framed around the guided activities.

These learning experiences may include:
- Personal working time
- 'Show and Do' student and teacher demonstrations
- Students working in pairs
- Whole class listening and analysis
- Small group listening and discussion
- Rotation listening
- Web publishing of successful extension work

Independent Learning
The instructional design of these resources support learners who prefer to work at their own pace. It also guides those learners who have been absent from formal class instruction and require 'catch-up' instruction.

Whole Class Learning
The common activity approach provides many benefits for efficient and meaningful learning. Both learner and teacher can be confident of the likely outcome of each instructional step; enabling all students to be potential peer-mentors for those less advanced students. A common set of core skills for the class enables all students to participate in group composition tasks such as Compositional Chairs (see YouTube for an explanation).
Scheduling a regular peer-listening component for each lesson will assist students to identify successful and creative use of musical and technical skills while also enabling them to measure their own achievement as compared to their peers.

Differentiated Task Completion
For various reasons, not all students will complete the activities in the allocated time. The instructional design makes it simpler to measure and assess student learning from the musical and technical skills evident in the activity parts that have been completed. (e.g. Learner X demonstrated a fundamental level of musical and technical understanding by completing 3 of the 7 Boomacious music technology activities.)

Using PDF's
The PDF approach to activity resources reduces the need to print to paper the instructional steps and encourages students to resize active windows or toggle their active desktop; an important technique as more instructional resources for music technology become digitized and 'on-line'.

Activity Duration
A minimum of 200 minutes of instruction time is advised however 300 minutes is recommended. This would equate to 6 to 8, 40 minute lessons.

Learning Design
Boomacious is built around a seven step learning structure known as EMDCARE. This is a generative learning model designed to support student learning activities which are focussed towards specific music ICT devices/processes/ concepts. It represents an approach to learning and teaching that draws upon a constructivist perspective to forming knowledge and understanding. The model suggests a 'Plug-in' learning strategy for students and teachers that provide a framework in which students explore, experiment and create music using Music ICT devices such as: software workstations, synthesizers, virtual instruments, and FX processors.

EMDCARE is an acronym for:
- **Experimentation** trying out general aspects of the device
- **Modification** altering through trial and error
- **Deconstruction** critically analysing preset sounds/patches (How does it work?)
- **Construction** creating your own sound/patch
- **Application** using the process sound/patch in a musically creative way
- **Reflection** summary of understanding and skills
- **Extension** moving beyond the given

The Experimentation and Modification stages are organised around Focus Activities that suggest what should be discovered but allows the learners time to explore. Peer tutoring is expected and the teacher should resist show and do demonstrations encouraging students to help each other. Student understanding is clarified through student explanation and demonstration, guided by the teacher.

The Deconstruction stage follows a worked example model. Key concepts and processes are demonstrated and the student actively experiments within guided parameters.

The Construction stage expects the student to demonstrate and apply the techniques learnt through the earlier stages within a similar product (patch/pattern).

The Application stage is where the student demonstrates a musical use for their device. This may be open in structure or guided. The culmination of this stage could be a live performance, recording or mix down of a musical composition, arrangement or improvisation.

The penultimate stage is Reflection in which the learner provides an insight into their understanding of the 'device' through a verbal or written explanation of the skills, processes, musical application and knowledge they have gained from this learning experience.

The final stage is Extension where the learner is encouraged and directed to move beyond the given information and create a musical work that includes and extends the skills and techniques developed through the activity. Learners are expected to work in a self-directed manner within broad suggested Focus Activities.

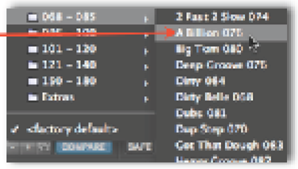
Learning Assistance Levels
Boomacious uses as an instructional resource model known as Amplified Instructional Depth (AID). This model offers increased levels of instructional assistance within tutorial style worked examples. The metaphor of amplifying or 'turning- up' (increasing) the assistance level is aimed at providing one instructional teaching resource from which the learner selects the level of detailed assistance they require to complete sequential guided learning steps.

Each Step features four levels of instruction:
1. A bold font summary of the step.
2. A more detailed italicised guide on how to perform the step.
3. A picture highlighting the focus of the step.
4. A multimedia (movie) demonstration combining a number of steps. (voice, text, and visual)

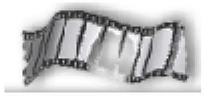
1 **Select either the Factory Default Pattern or any other Preset Pattern from the Library**

2 *Move the pointer to the Preset Librarian menu and click to open the menu. Move the pointer to the either Factory default option or click on a Preset folder and click on one of the Pattern titles to select it. Preview the patterns if you wish.*

3



4



This approach to guided instruction is designed to allow the learner to choose the depth of instructional assistance they require. Should the learner be confident with a particular step, they need only read the bold step summary and then perform the action. Should they require additional information, they may choose to read the detailed guide, then perform the action. The picture guide may be used in preference or in conjunction with reading the steps but may also be used to confirm or clarify their understanding of how to perform the action. A movie summary of the task steps is also provided as an additional instructional option.

Assessment

How teachers measure student learning and understanding will vary depending upon their personal values and the curriculum requirements of their school. An assessment model is presented in Boomacious that encourages student self-reflection, peer-interaction and the electronic submission of work.

The assessment structure for each activity is as following:

- The exporting of their work as a stereo audio wave file
- Evidence of their editing by the use of a screenshot
- The preparation and writing of a self-reflection commentary
- A rubric based self-assessment and peer-assessment task.
- Electronic submission of audio file and commentary (including screenshot and self/peer-assessment)

The self-reflection component of the assessment is important as it provides students with the opportunity to think about and consider what they have learnt. These question prompts are:

1/ What was the intention of the music?
2/ What editing devices did you use?
3/ What musical arranging devices were used?
4/ Describe the various sections of the music.
5/ Which section do you think sounds the best and why?
6/ How could this music be improved?

Students are encouraged to write three or more valid points to address each question.

The Evaluation Rubric is intended to assist students grade their work. The selected tasks used for assessment are based upon identifiable editing steps contained within the activity. Three descriptive indicators with a simple grading system of 2, 1 or 0 marks is used. Some lesson time should be allocated to training students how to assess using this rubric. In the suggested assessment method, students do not need to write on the rubric. Printing this rubric and directing students to write their assessment scores on it provides further opportunity for discussion and clarification.

Overview of Boomacious Activity

Focus: Creation of a 40 second MIDI based drum recording.

Scenario: A recording studio band has advertised for a drum machine programmer and wants a 'demo' recording.

Musical Focus: rhythm, texture, style, form, dynamics and tempo

Technical Focus: inserting virtual instruments, creating and saving rhythm patterns, mixing to audio files

Learning Focus: planning, analyzing, reflecting, revising, and explaining

Summary of Tasks within each Activity Part

Part 1: Experimentation
1A: Creating the Project
1B: Experimentation Challenge 1

Part 2: Modification
2A: Open the Boomacious Session
2B: Modification Challenge 2

Part 3: Deconstruction
3A: Open the Boomacious Session
3B: Deconstructing a Patch
3C: Construction Challenge 3
3D: Patterns and Variations
3E: Construction Challenge 4
3F: Saving Your Own Pattern Preset
3G: Deconstructing a Pattern

Part 4: Construction
4A: Focus Activities

Part 5: Application
5A: Preparing to Record
5B: Recording Using Pencil Tool (Manual MIDI Record)
5C: Adding Crash Cymbals and other Sounds
5D: Mix Down (Bounce to Disk)

Part 6: Reflection
6A: Preparing Evaluation Commentary
6B: Screenshot Capture
6C: Evaluation
6D: Submitting Work

Part 7: Extension

4.3 Exegesis

This chapter presents a critical explanation of the *Boomacious* instructional resource by firstly identifying and discussing the theoretical underpinnings that have influenced this work. This is followed by an explanation of how current teaching practice is represented within secondary school Music ICT instructional resources. A researcher developed constructivist influenced Music ICT learning framework is then presented followed by an explanation of a researcher developed learning design model; both are used extensively within the structural and learning design of *Boomacious*. A guided analysis of *Boomacious* then explains the focus and purpose of each activity section and how this work represents its theoretical foundations.

4.3.1 Theoretical Underpinning

Constructivism

The origins and significance of constructivist learning theories were identified and discussed earlier within the folio introduction. Of particular importance is the notion that learners construct their own knowledge and understanding based upon an active process of reflection and assimilation, centred upon their personal and social experiences (Fosnot, 1989). Brooks and Brooks (1993) suggest that educators who design learning experiences for students using constructivist notions of learning base their designs on the following five instructional principles: posing problems of emerging relevance to students; structuring learning around primary concepts; seeking and valuing students' points of view; adapting curriculum to address students' suppositions; and assessing student learning in the context of teaching.

Norton and Wiburg (1998) believe that in addition to these five instructional principles "educators who understand learning as construction (also) choose tools and activities that afford a variety of opportunities for constructing knowledge" (p.31). Polin (1992) suggests that some of the characteristics that constructivist influenced educators consider when selecting tools include whether: they promote learning as a whole, meaningful task, not as a sub-skill; they carry some of the burden of the task by 'scaffolding' the elements of the task that the learner cannot accomplish alone; and they allow for increasingly complex versions of the tasks to be carried out by gradually returning the task burden to the learner. This idea of using tools, and in particular computing based tools, to help learners construct knowledge and understanding has been advocated through the constructionist theories of Seymour Papert.

Constructionism

Constructionism is a learning theory proposed by Papert (1980) that in its simplest definition emphasises the importance of 'learning-by-making' (Papert and Harel, 1991). Constructionist learning builds upon the Piagetian constructivist model of individual learners constructing mental models to understand their world and suggests that learning happens most effectively when people are also active in making tangible objects in the physical world.

> Constructionism differs from other learning theories along several dimensions. Whereas most theories describe knowledge acquisition in purely cognitive terms, constructionism sees an important role for affect. It argues that learners are most likely to become intellectually engaged when they are working on personally meaningful activities and projects. (Kafai and Resnick, 1996 p.2)

Papert demonstrated through his development of the LOGO mathematical computing environment that "structured thinking becomes powerful thinking" (Papert, 1980 p.180). Papert built upon Dewey's observation that children learn through social interaction with all members of their society through a process of real participation and playful imitation (p.179). Papert's vision for the use of the computer has nothing to do with the transmission of information. Rather, he regards computers as a tool to enable children to do things that they couldn't otherwise do (Jennings and Tangney, 2001). Papert also identifies the importance of establishing a context for learning by stating that "educational innovators must be aware that in order to be successful they must be sensitive to what is happening in the surrounding culture and use dynamic cultural trends as a medium to carry their education interventions" (1980 p.181). This notion of situating learning within authentic current cultural trends is of particular interest to music educators using Music ICT as a vehicle for engaging student interest (Crawford, 2009a).

Constructionist learning theories have inspired much research and discussion particularly within the fields of Science and Mathematics education (Kafai and Resnick, 1996). A number of music researchers have drawn upon the constructionist philosophy of building knowledge and understanding through active planning, building and playful exploration using technology. Jennings and Tangney (2001) describe a Papert inspired constructionist approach to music learning through a self-developed, non-notation software micro-environment titled DrumSteps. Of interest was their pedagogy which emphasised initial playful exploration to establish familiarity followed by four fields of exercises described as: listen and create, listen and perceive, look and imagine, and rearrange the following. Graphic symbols represent a waterfall piano-roll style composing interface with a hierarchy of graded exercises and suggested learning activities.

A project by the MIT Media Lab titled, 'MICK: Constructionist Toolkit' (Thibault et al., 2003), highlighted the interplay between music, science and engineering design. The software and electronic components enabled students to rapidly prototype a wide variety of musical instruments in the belief that "appropriate uses of technology can provide children with learning experiences that would fundamentally challenge our assumptions and our stance towards music education" (Thibault et al., 2003 p.1).

Further examples of constructionist influenced applications for Music ICT are demonstrated within the work of Subotnik (2013), Dillon and Brown (2010) and a broad range of game-based music education applications (apps) available for the Apple iPad. Network Jamming systems developed by Dillon and Brown (2010) apply constructionist visions for computer technology to a generative media multi-arts environment, using an interactive collaborative media performance approach. Since the mid 1990s, Subotnik (2013) has designed music software that introduces children to the world of music and composition through computer based games. Through the use of a drag-and-drop or painting style interface, students explore, discover and create music by arranging graphics, sound objects, and painting colours all of which play back. Apple iPad apps are also a growing source of games-based music education; reflecting a constructionist perspective of learning and knowledge construction through an emphasis upon active learning through 'making' using technology. Examples include: Rhythm Repeat Lite (Filpo Games, 2011), Dr Seuss Band (Oceanhouse Media, 2013), and Soundrop Pro (Develoe LLC, 2010).

This brief overview suggests that constructionist learning theories underpin much of our use of Music ICT within education. More importantly, it also indicates that Music ICT is not merely a 'tool' for creating music but should be regarded as a cognitive amplifier that enhances the learner's musical knowledge and understanding (Brown, 2007; Lajoie, 2005).

Constructivist Instructional Design Theories

Instructional design has been described as a systematic and reflective process for translating principles of learning and instruction into plans for instructional materials, activities, information resources and evaluation (Smith and Ragan, 2005). A summary regarding Instructional Design and the influence of constructivist learning theories has been outlined within the introduction section of this portfolio (section 1.3.1, p35). This summary proposes that the study of learning and teaching during the 21st Century has been increasingly influenced by constructivism and social learning theories (Jonassen et al., 2005) resulting in a more pragmatic, moderate and inclusive view of instructional approaches (Reigeluth and Carr-Chellman, 2009). All instructional processes are now regarded as tools to aid in the construction of learner knowledge (Jonassen, 1999 p.217).

Merrill (2009; 2002) formulated an instructional theory titled 'First Principles of Instruction' based upon a set of interrelated prescriptive instructional design principles that were found to be common to behaviourist, cognitivist and constructivist instructional design models. It emphasises the principles of Demonstration, Application, Task-Centred, Activation and Integration to promote learning. The *Boomacious* learning activity features all of these principles while also including other important learning principles such as exploration, guided discovery, and construction.

Learning Design Using Multimedia

Instructional designers have continued to identify and draw upon a range of theories and tools to improve learning. One area that has attracted considerable interest is the use of multimedia and its representation of literacies through multiple modes of learning (Schnotz, 2005; Schnotz and Bannert, 2003). The premise of multimedia learning is that people learn more deeply from words and pictures than from words alone and Mayer identifies this as being the *multimedia principle* (Mayer, 2005). The term multimedia can conjure up a variety of meanings that include: viewing multiple screens with immersive sounds; live performance using film, images, lighting, sound and acting; computer software using graphics, text and spoken word such as PowerPoint or Keynote; as well as DVD movies. For the purposes of this research, multimedia is defined as the joint presentation of words and pictures, such as printed text or spoken text combined with illustrations, photos, animation, sound, or video. Multimedia learning is defined as occurring when people construct personal knowledge through a process of building mental representations based upon the presentation of words and pictures. Multimedia instruction involves designing the presentation of words and pictures with the intention of promoting learning (Mayer, 2005 p.2). These definitions situate the *Boomacious* instructional materials as a representation of multimedia learning.

The use of multimedia instructional material has the potential to substantially improve student learning as compared to the use of a single media (Mayer and Moreno, 2002). Research suggests that if multimedia instructional materials are well-designed, the combining of text and illustrations or narration and animation/movie enhances student understanding (Goldman, 2003; Mayer et al., 2001). Roy and Chi (2005) suggest that the two distinct advantages of multimedia resources over a single medium are that different modes (text/oral) and types of external representations (text or illustrations) can provide both unique perspectives and tailored instructional descriptions that increase the likelihood of student understanding.

Mayer's Cognitive Theory of Multimedia Learning (2009) describes three basic assumptions as to how the human mind works. The first assumption is that humans possess *Dual-Channel* information processing for visually represented material and auditorily represented material, and that visual images are processed concurrently with aural. This is based upon the dual-coding theory of Paivio (1986) and Baddeley's model of working memory (Baddeley, 1999; 1986). The second assumption is that humans possess *Limited Capacity* with regard to the amount of information that can be processed in each information channel at any one time and this is based upon the *Cognitive Load Theory* of Chandler and Sweller (1991). The third assumption is *Active Processing*, and it assumes humans engage in active learning by attending to relevant incoming information, organizing selected information into coherent mental representations, and then integrating these mental representations with other knowledge. This is based upon the Selecting, Organising and Integrating model (SOI) (Mayer, 1999) and the Generative Processes of Comprehension by Wittrock (1989). Recent neuroscience research is beginning to support the previously speculative theories of dual coding, cognitive overload, and multimedia learning (Fougnie and Marois, 2006).

Lemke (2008 p.12) summarised the following eight multimedia learning principles derived from the research based work of Mayer and Moreno (2003; 1998), Chan and Black (2006), and Ginns (2005).

1. *Multimedia Principle:* Learning retention is improved through words and pictures rather than through words alone.

2. *Spatial Contiguity Principle:* Students learn better when corresponding words and pictures are presented near each other rather than far from each other on the page or screen referred to as the *Split Attention Principle* (Ayres and Sweller, 2005).

3. *Temporal Contiguity Principle:* Students learn better when corresponding words and pictures are presented simultaneously rather than successively.

4. *Coherence Principle:* Students learn better when extraneous words, pictures, and sounds are excluded rather than included.

5. *Modality Principle:* Students learn better from animation and narration than from animation and on-screen text.

6. *Redundancy Principle:* Students learn better when the same information is not represented in more than one modality – redundancy interferes with learning.

7. *Individual Differences Principle:* Design effects are greater for learners possessing a low-knowledge base than for learners possessing a high-knowledge base; and for high-spatial learners rather than for low-spatial learners.

8. *Direct Manipulation Principle:* As the complexity of the materials increase, the positive impact of direct manipulation of the learning materials (animation, pacing) on transfer also increases.

From this summary, three specific principles provided an important foundation support for the adaptive guided instruction approach used within the *Boomacious* instructional resource. The first is the *Redundancy Principle* that suggests a learners' working memory load is increased if essential information and redundant (repeated) information is included (Sweller, 2005). The second is *Individual Differences Principle* that suggests low and high-knowledge base learners benefit from different styles of instruction. The third is the *Direct Manipulation Principle* that implies guided 'hands-on' manipulation and experimentation is important when the complexity of the learning materials increase. These three principals are discussed further following the explanation of the Amplified Instructional Design (AID) model in section 4.3.4 (p.341).

Mayer's Cognitive Theory of Multimedia Design has generated considerable research interest with several studies confirming a multi-modal approach combining text, images and narration can result in improved learning retention, as compared to a single instructional mode (Kennedy et al., 2011; Wang et al., 2011). Other research confirms that a reduction in learning transfer based on split attention and increased cognitive load theories is likely when text, graphic, and voice are disconnected (Austin, 2009; Mayer et al., 2008; Tabbers et al., 2005).

Multimedia and its use with ICT offer considerable promise for instructional design. However; Clark and Feldon (2005) identified five common misconceptions with regard to the use of multimedia for learning. They found that the research evidence indicated:

- Multimedia does not increase student learning beyond any other media, including live teachers.
- Though multimedia may be more attractive to students, learning tends to decrease as students feel the course requires less work.

- A pedagogical approach of tailoring multimedia instructional sequences to learners' different learning styles is yet to be validated.
- Socially engaging animations and avatars seem to produce cognitive overload and become a distraction, diminishing instructional effectiveness.
- Constructivist-based discovery and problem-based learning pedagogy that is unguided or minimally guided, tends to 'harm learning' for students with less prior knowledge, while being beneficial for students with more prior knowledge. Ironically, strong instructional guidance and scaffolding 'interferes' with the learning of more advanced students, while being beneficial for less advanced students.

Clark and Feldon (2005) believe that multimedia instruction offers extraordinary benefits to education but, like all new and exciting education innovations, its potential and achievements can be over emphasised. They suggest that adapting and tailoring instruction to the prior knowledge and learning goal orientation of students seems to be most beneficial and this does not require most of the features of multimedia instruction. Lemke summarises these views by stating:

> In practice educators are getting mixed, albeit positive trends in the use of multimedia to augment learning. Students engaged in learning that incorporates multimodal designs, on average, outperform students who learn using traditional approaches with single modes. (Lemke, 2008 p.13)

There have been a limited number of music related research studies examining multimedia and instruction. Research by Yu, Lai, Tsai and Chang (2010) examined the learning performance of grade four primary students in Taiwan comparing the learning of an experimental student group using a range of multimedia tools with a control group used 'musical notations'. Their study found that students in the experimental group showed a higher level of learning achievement and motivation than those in the conventional group. They concluded that multimodal presentations were helpful to scaffold learning. A study by Gimenez and Saenz de Jubera (2001) examined the effectiveness and efficiency of using a multimedia training manual compared to a print based manual for instruction novice users learning a music score editing program. This study found that the digital video component and media design interface played an important role in creating a positive perception from the user towards using the multimedia manual, as compared to the print based version. Additional research exploring multimodal learning perspectives (indirectly linked to multimedia learning) have been offered by Breeze (2011) and Gall and Breeze (2005).

Evaluation and Assessment

Assessment of student learning is regarded as a critical part of the teaching process and reflects a deeply ingrained educational idea that has a profound effect on what and how teachers teach, what students study, and what kinds of knowledge and skills are valued (Eisner, 1994). Terms such as evaluation, assessment and testing are often used interchangeably (Herman et al., 1992), and can be used for summative and formative purposes, such as to decide appropriate initial learning goals for students; to decide if students are ready for the next learning experience; to consider whether specific topics or skills have been mastered; and to establish the grades that students receive (Bauer, 2005). Changing notions of learning and the idea of teaching for learning rather than testing, have promoted alternative assessment models that align instruction, curriculum and assessment in a way that requires learners to generate a response rather than choose a response (Norton and Wiburg, 1998). These generative responses can be represented in a range of ways such as: a reflective explanation of their learning that can be spoken or written; a portfolio that selectively demonstrates the development and evolution of their learning; or a performance product that physically represents their learning (Clarke and Agne, 1997).

Criteria for judging acceptable student performance lie at the heart of alternative assessment models and unlike some traditional assessment approaches that produce a right or wrong answer, criteria based assessments can allow for interpretation, subjectivity and multiple perspectives (Norton and Wiburg, 1998). Herman, Aschbacher and Winters (1992) claim that scoring rubrics are a way of making criteria standards clear and visible. They suggest that rubrics should identify, define and give examples of the traits and dimensions that are the basis for judging student responses. They should also provide a scale of values on which to rate each dimension, as well as examples that illustrate these value levels.

4.3.2 Instructional Resources and Music ICT

An instructional resource is defined by Smith and Ragan as any material that has been developed to facilitate learning toward identified learning goals (Smith and Ragan, 2005 p.6). For the purposes of this research, a Music ICT instructional resource is defined as any training or teaching material that has been designed to support learning using Music ICT. This inclusive definition recognises that there is a wealth of training and learning support materials available, ranging from professionally published books, teacher developed tutorials to hobbyist 'how-to' YouTube movies (Rudolph and Frankel, 2009). For clarity within this research, this chapter focuses upon the Music ICT instructional resources and current practices that are intended for use within secondary school music programmes. Further details regarding ICT and Music ICT within Australian secondary schools is also provided in section 3.2.2 of this folio.

The Beginnings of Music ICT Teaching Resources

The origins of Music ICT within the secondary school curriculum stem from the converging of technologies within western society during the 1960s and early 1970s which contributed to the creation of electronic music studios within University institutions, improved multi-track recording techniques, affordable synthesized electronic instruments and a small percentage of student graduates entering the teaching profession with a broad interest in music making using technology (Crawford, 2009a; Webster, 2002b; Higgins, 1992). Instructional resources aimed at supporting learners with creating music using this new technology emerged through the publication of articles and books such as: "Electronic Music in the Classroom" *Tahourdin,1969*; Descriptive Notation for Electronic Music *Fennelly,1969*; Electronic Music: Systems, Techniques & Controls *Strange,1972*; Principles & Practice of Electronic Music *Trythall, 1973*; Modern Recording Techniques *Runstein, 1974*. These publications described in written and diagrammatic form the processes for creating and recording electronic music using the then, 'state-of–the-art' technology. Much of the suggested pedagogy was designed toward independent and self-directed learning as most schools during the 1970s were only likely to have a single synthesizer or multi-track tape recorder (if they were lucky!).

The evolution of affordable computing and MIDI technology in the 1980s continued the need for instructional training resources. However, there was little change in the pedagogy, with instrument specific and independent learning being emphasised (Massey, 1986). The emergence of Computer-Aided Instruction and Computer-Aided Learning models within the United States and the United Kingdom during this period saw the introduction of Music ICT into the curriculum as both a learning aid and a creativity tool (Crawford, 2009a).

The music computer laboratory emerged during the 1990s, with the initial pedagogy embracing individual learning through drill and practice activities, as well as personal composition or improvisation aids (Haldey, 1996). Instructional resources were generally print based task sheets, outlining learning expectations. By the late 1990s new instructional resource approaches emerged which designed musical learning through guided activities that featured tutorial style activity sheets, labelled screen shots, sequential guided steps, as well as activity scenarios, providing a context for the learning experience (Wells, 1999). New technology possibilities and teaching philosophies emerged during the 2000s enabling teachers to employ authentic teaching and learning contexts (Crawford, 2009a), transporting isolated music workstations towards global and interdependent learning perspectives.

Research into Music ICT Teaching Resources

Despite a recent proliferation of music ICT teaching resources suitable for secondary classroom music teaching, there are very few published music research studies that directly analyse the instructional design and pedagogy of these resources. However, there is a considerable body of research that does explore student creativity using music technology and from this literature it is possible to draw an insight into the instructional design methods and pedagogical approaches used by the researchers and teachers.

It has become an accepted pedagogical approach for teachers to create their own Music ICT instructional support materials in the form of task sheets, worksheets, and tutorials that guide students to develop contextual musical knowledge linked to technological process skills (Gall and Breeze, 2008; Jennings and Tangney, 2001; Rogers, 1997). These resources are often context specific and intended for specific learning groups and their needs (Ward, 2009).

A common feature includes template style pre-load project files providing more complex musical examples within a scaffolded learning structure (Davis et al., 2000). It is also common practice for teachers to share instructional resources and pedagogy approaches through websites and online forums (Wardrobe, 2012; Humberstone, 2012).

King and Vickers (2007) noted that instructional resources provided with music software packages (on-line support manuals and detailed PDF manuals) are often written in language more appropriate for audio professionals than music technology students. Information is frequently presented as procedural knowledge (Anderson, 1996), often overburdening students with technical specifications and data about devices but rarely pedagogical strategies for problem-solving (King and Vickers, 2007).

Current Practice with Music ICT Instructional Resources

To identify what current practice looks like with Music ICT instructional resources, a range of published resources were chosen and analysed using researcher developed criteria (Table 23). The selection of resources was based upon the following criteria: the resource was intended for the use of secondary age students within a school music curriculum; it focused upon specific music software likely to be used by schools; it was published within the last decade; and it was available within Australia. The analysis criteria reflect aspects of Understanding by Design (Wiggins and McTighe, 2006), as well as a pragmatic Constructivist Instructional Design philosophy (Merrill, 2009; Reigeluth and Carr-Chellman, 2009; Merrill, 2002). The researcher analysis is not intended to identify the relative merit or value of each instructional resource, as each supports student learning from a variety of learning perspectives and for differing learning outcomes, but rather to highlight their underlying instructional design and pedagogical strategies.

Table 23: Music ICT Instructional Resource Analysis

	Using Pro Tools in Music Education Robin Hodson 2010	Teaching Music with Reason Sobey-Jones 2004	Cubase Classroom Resource Pack Kitchenham, 2007	Music Creation Using Garage Band Hubmayer, 2010	Making Music With Garage Band and Mixcraft Hodson et-al 2011,
Curriculum Statements Learning Objectives	Learning outcomes for each module	Lesson aims and student skills listed	Very detailed – Self developed mapped checklist	Detailed with musical and technical focus	US based National Music Standards. Learning objectives stated
Pedagogy suggestions: Lesson Plans Sequence	Yes, suggested lesson procedures, sequential modules	Extensive detail for teaching plan for each lesson	Very Detailed	Step-by-Step for each guided activity.	Step by Step for each activity – activities do not have to be sequential
Skills Acquisition Prior /Embedded in Activity	Skill development is to watch suggested skill movies and copy – then tackle activity	Embedded within activity, student activity sheet, then step-by step 'how-to' guide	Embedded within activity	Skills and detail embedded within guided activity	Combination of prior skill development and embedded learning through worked example
Authentic Work examples Listening	Wide range of MIDI and audio	Wide range of authentic recording and mixing activities	Pre-recorded multi track	Authentic scenarios create reason for learning activity	Broad range of activities that cover the software. Listening examples suggested
Scaffolding worked examples	Module Templates with resources – modules outlined not step-by-step	Lesson Templates – guided activities	Step by Step worked examples with resources	Finished Exemplars and Templates with catch up load points.	Templates with resources
Instructional Layout	Sequential numbered procedural steps	Sequential numbered procedural steps	Sequential numbered procedural steps	Sequential and linear with numbered procedural steps	Sequential and linear with numbered procedural steps
Assessment: Criteria Reflection grading-Self/peer teacher	Suggested questions, no mark scheme. Folio and process	Occasional self and peer assessment, portfolio of lesson work, criteria based.	Comprehension of screenshots, quizzes, self-reflection, marking scheme provided	Self and peer assessment. rubric marking scheme Self-reflection	None
Presentational Format Print/ Multimedia/ PDF	Print with minimal screenshots, and movies	Printed books and PDF with annotated screenshots	PDF with referenced but not embedded movies	PDF with extensive step by step screenshots	Print. Additional explanation on PDF but not of activity. Movies of general processes – not step by step
Extension Activity Detail	Yes, new techniques introduced	None	None	Yes, focused on applying guided activity content	Brief suggestions

A reading of the analysis (Table 23) identifies that there are many similarities between the five selected publications. Similarities include:

- A statement of learning objectives for each activity.
- Pedagogical suggestions and a sequence of lesson plans.
- Authentic work examples.
- The use of template scaffolds.
- An instructional layout that is sequential with numbered procedural steps.

Differences or variations between the selected resources include:

- Embedding of software process skill development within the learning activity rather than as a separate earlier activity (Hodson et al., 2011; Hodson, 2010).
- Inclusion of assessment criteria and grading (Hubmayer, 2010b; Kitchenham and et.al., 2007; Sobey-Jones, 2004).
- Variations in presentational format e.g., PDF, annotated screenshots, process example movies, and extension activities based upon the activity content (Hodson, 2010; Hubmayer, 2010) (Hubmayer, 2010b; Hodson, 2010).

Of particular interest is the range of learning assessment models. Approaches include: student self-reflection based upon criteria questions; self and peer assessment using a descriptive rubric; process questioning and explanation dialogue between student and teacher; screenshot labelling and process descriptions; and a collection of short process examples combined into a folio of work. Several of the resources gave quite in depth detail regarding the assessment design model (Hubmayer, 2010b; Kitchenham and et.al., 2007), while others treated it in a cursory manner leaving the assessment process for the teacher to develop.

Extension learning activities intended to provide students with the opportunity of exploring and deepening their understanding of processes and concepts were also represented in a number of ways. These included: students working in a self-directed manner applying the techniques and processes used within the initial guided learning activity (Hubmayer, 2010b; Hodson, 2010); the introduction of additional process and technique material (Hodson, 2010); and brief scenario suggestions that required further teacher planning (Hodson et al., 2011).

The table also identifies a number of pedagogical and design strategies that can be linked to a range of instructional learning theories. These include:

- Direct Instruction (Rieber, 1992; Becker and Engelmann, 1977): explicit learning with directions broken down into a pre-requisite order.
- Worked Examples (Ward and Sweller, 1990): for demonstrating examples of process steps to achieve specific musical outcomes.
- Instructional Scaffolding (Yelland and Masters, 2007; Wood et al., 1976): use of pre-load templates to provide more sophisticated musical examples to manipulate.
- Authentic Learning (Kearney and Schuck, 2008; Herrington and Oliver, 2000): use of authentic musical material and scenario based activities.
- Multimedia Design (Mayer, 2009): the use of a combination of presentation modes including printed page, PDF's, annotated screenshots, recorded voice and movies.

4.3.3 Learning Framework: EMDCARE

Boomacious is based upon a researcher developed learning framework referred to as EMDCARE. EMDCARE is a generative learning model designed to support student learning activities which are focussed towards specific music ICT devices/processes/concepts. It represents an approach to learning and teaching that draws upon a constructivist perspective to forming knowledge and understanding. The model suggests a ‘Plug-in’ learning strategy for students and teachers that provides a framework in which students explore, experiment and create music using Music ICT devices such as software workstations, synthesizers, virtual instruments, and FX processors. Each *Boomacious* chapter heading (referred to as activity Parts) is named after the stages in the EMDCARE learning process model.

EMDCARE is an acronym for the following learning processes:

- **Experimentation** trying out general aspects of the device
- **Modification** altering through trial and error
- **Deconstruction** critically analysing preset sounds/patches (How does it work?)
- **Construction** creating your own sound/patch
- **Application** using the process sound/patch in a musically creative way
- **Reflection** summary of understanding and skills
- **Extension** moving beyond the given

The *Experimentation* and *Modification* stages are organised around focus activities that suggest what should be discovered but allow the learners time to explore. Peer tutoring is expected and the teacher should resist show and do demonstrations, and instead encourage students to help each other. Student understanding is clarified through student explanation and demonstration, guided by the teacher.

The *Deconstruction* stage follows a worked example model. Key concepts and processes are demonstrated and the student actively experiments within guided parameters.

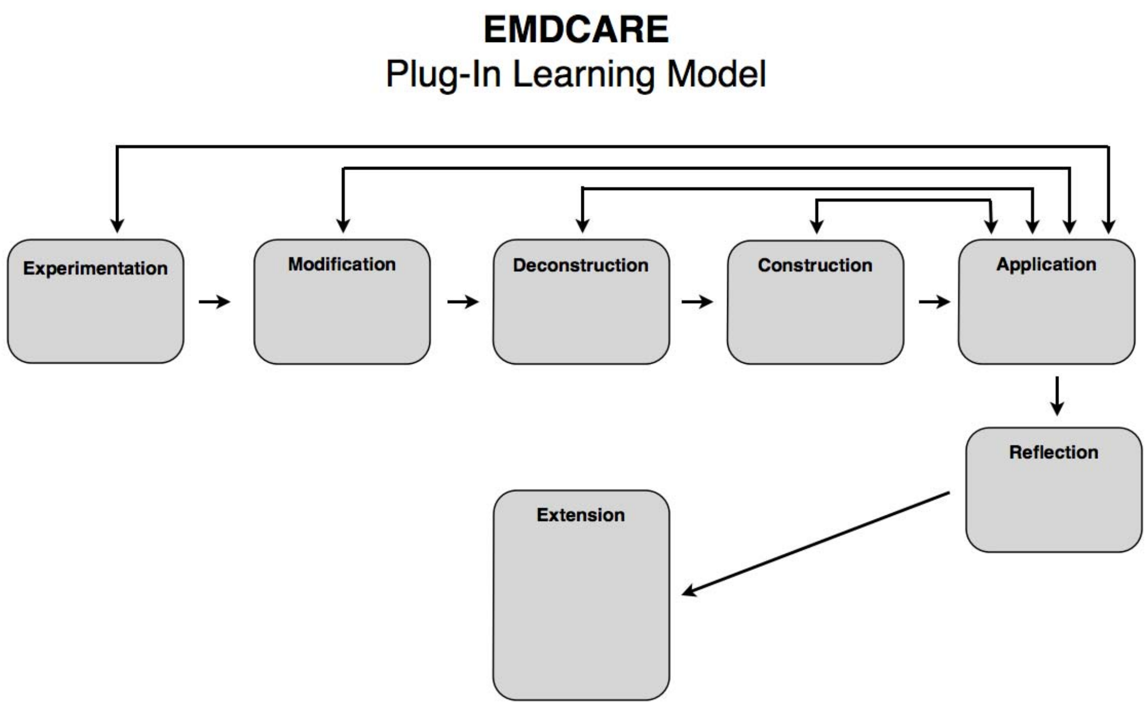
The *Construction* stage expects the student to demonstrate and apply the techniques learnt through the earlier stages within a similar product (patch/pattern).

The *Application* stage is where the student demonstrates a musical use for their device. This may be open in structure or guided. The culmination of this stage could be a live performance, recording or mix down of a musical composition, arrangement or improvisation.

The penultimate stage is *Reflection* in which the learner provides an insight into their understanding of the 'device' through a verbal or written explanation of the skills, processes, musical application and knowledge they have gained from this learning experience.

The final stage is *Extension* where the learner is encouraged and directed to move beyond the given information and create a musical work that includes and extends the skills and techniques developed through the activity. Learners are expected to work in a self-directed manner within broad suggested focus activities.

Figure 62: EMDCARE Plug-In Learning Model



Although this model is described in a linear manner, holistically, the learning process allows for recursive loops to any previous stage, particularly during the Application stage. The need for further sound textures or 'tweaking' of the constructed patches may emerge during the *Application* stage resulting in the learner briefly returning to any of the earlier stages until an appropriate texture is found, modified or created.

The EMDCARE model evolved from a simpler learning model that was titled EMDCA, which did not include the *Reflection* and *Extension* stages. The EMDCA model was first presented in 2009 at two Australian music conference workshops (Hubmayer, 2009b; 2009a) [see DVD Appendix 52]. The addition of the *Reflection* and *Extension* stages were introduced into the model to encourage students to reflect and evaluate their understanding and skills and then to move beyond the guided structures and generate their own musical uses for the skills and techniques.

4.3.4 Design Model: AID

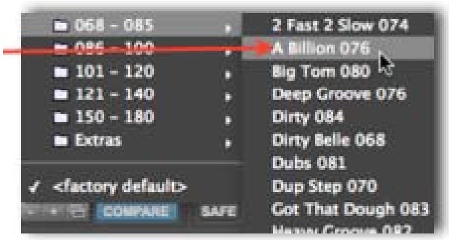
In addition to the EMDCARE learning framework, *Boomacious* features a researcher developed instructional design model referred to here as AID. Amplified Instructional Depth (AID) is an instructional resource model that supports learner's knowledge construction through increased levels of instructional assistance. It is particularly suited to learning activities that include tutorial style worked examples. The metaphor of amplifying or 'turning-up' (increasing) the assistance level is aimed at providing one instructional teaching resource from which learners select the level of detailed assistance they require to complete sequential guided learning steps. The AID instructional design model is used throughout *Boomacious* and it is represented in the following way.

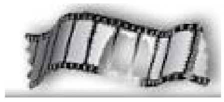
Each Step features four levels of instruction:

1. A bold font summary of the step.
2. A more detailed italicised guide on how to perform the step.
3. A picture highlighting the focus of the step.
4. A multimedia (movie) demonstration combining a number of steps (voice, text, and visual).

Figure 63: Example of Increased Levels of Instructional Assistance (AID Design Model)

1. **Select either the Factory Default Pattern or any other Preset Pattern from the Library**
2. *Move the pointer to the Preset Librarian menu and click to open the menu. Move the pointer to the either Factory default option or click on a Preset folder and click on one of the Pattern titles to select it. Preview the patterns if you wish.*

3. 

4. 

This approach to guided instruction draws upon the eight multimedia principles outlined by Lemke (2008) by allowing the learners to choose the depth of instructional assistance they require. Should the learners be confident with a particular step, they need only read the bold step summary and then perform the action. This is an application of the *Redundancy Principle.* Should they require additional information, they may choose to read the detailed guide, and then perform the action (*Direct Manipulation Principle*). The picture guide may be used in preference or in conjunction with reading the steps, but may also be used to confirm or clarify their understanding of how to perform the action (*Individual Differences Principle).* A movie summary of the task steps is also provided as an additional instructional option. This is an application of the *Modality Principle.*

4.3.5 Resource Development

The *Boomacious* instructional resource presented within this portfolio is currently the third version of this work. A brief discussion of the development of this instructional resource is now provided.

Computer and Software Tools

A broad range of computer software programs have been used to create the *Boomacious* resource. The principal desktop publishing software was Pages '09 (Apple), although initial planning and layout concepts commenced using Publisher 2010 (Microsoft). The Pages software allowed for extensive use of floating text boxes, graphics masking, layout themes, snap alignments, reflections and shadows. Snapz Pro X (Ambrosia Software) was used for screen shot captures of the digital audio workstation, Pro Tools (Avid) version 10.3.3, while desktop movies were recorded and edited using ScreenFlow (Telestream) version 4.0.2. The principal computer used during the creation of this instructional resource was a MacBook Pro (Apple) that also ran Parallels version 8 (a PC emulator running Windows 7).

Versions of Document

The initial *Boomacious* learning activity commenced in 2009 and was created to demonstrate an application of the EMDCA learning model. It was presented within a music ICT workshop for the Music Technology Educators Conference 2009 (Hubmayer, 2009a). An example of this design is included as Appendix 46. The *Boomacious* learning activity was rewritten and significantly extended during late 2011 to reflect the enhanced EMDCARE learning model and the AID design model. This second version document included a range of improvements. The most significant was a new page design that employed themed colours, 3D layering and shadow effects to produce a more visually appealing aesthetic for the learner. The guided descriptions were significantly refined and the reflection stage required the use of additional word processing steps for the learner. Another significant improvement was the use of Movie demonstration to illustrate the guided instructional steps. This movie approach initially followed the guided step information language.

Refining through Student and Teacher feedback

The second version *Boomacious* learning activity was trialled by the researcher with a music class comprising 11 students (3 girls and 8 boys) between 17-18 years of age during February 2012. The instructional resource was used as an initial software familiarity activity for a year 12 music technology subject and was regarded as a required skill development activity. The class was an off-line, after hours subject which met once weekly for 150 minutes. Students were provided with four 60 minute class sessions spread over four weeks. The class initially followed a teacher guided process which encouraged student interaction and interdependence during the challenge sections of the *Experimentation*, *Modification* and *Deconstruction* stages. This whole class teacher guidance began to fade as students became more independent and progressed at their own learning pace. Individual coaching of students during The *Construction* and *Application* stages typified the second and third lesson. The fourth session included some students concluding the *Reflection* and commencing the *Extension* activity. No additional class time was provided after the fourth lesson and student work was submitted during week 5 and week 6. A student feedback survey was completed during a 15 minute period during the week 6 lesson.

Table 24: Boomacious Student Completion Rate Table

n = 10 (1 withdrew from subject)

Experimentation	Modification	Deconstruction	Construction	Application	Reflection	Extension
0	0	0	1	1	5	3

Two colleague teachers whom the researcher regarded as experienced with Music ICT also individually trialled the resource. Their trial was self-directed and independent of any additional support. Both teachers provided feedback during an interview.

The third version of the *Boomacious* learning activity is a refined version of the second generation document and reflects the following suggested improvements from students and teachers:

- the reintroduction of arrows to link text to diagrams to enhance instructional clarity
- minor editorial corrections
- a conversational approach to the demonstration movie dialogue so as to provide an alternative to the scripted instructions
- numbering the instructional steps within the movie so as to allow easier identification of processes
- a teacher focussed explanation that provides suggestions for class pedagogy that supports the learning and instructional design of the resource.

4.3.6 Guided Analysis of Boomacious

The following guided analysis demonstrates how the *Boomacious* instructional resource is a representation of pragmatic constructivism through the blending of constructionist and guided instructional design principles. This analysis uses the term student and learner interchangeably and the discussion is from the viewpoint of a secondary school classroom teaching resource, although *Boomacious* can be used as an individual learning resource.

The instructional resource is intended to be a group based learning activity so that social interaction through peer guidance and explanation is an important part of the learning design. Specific and detailed instructional guidance is supported within *Boomacious* by the differentiated AID design model which is intended to support low and high knowledge learners as they progress at different paces through the designed learning activity. The multimedia and multi-modal approach to supporting instructional guidance is also evident within the AID learning design model. Constructivist influenced pedagogies are evident in discovery and exploration challenges that provide students with the opportunity to speculate through trial and error. Constructionist influences are evident in *Challenge* activities that encourage students to create musical works by drawing upon interdependent learning support provided through paired or small group discussion. The learning quality of these discussions requires influential and judicious teacher modelling to ensure that knowledge construction and misunderstandings are clarified in a timely and efficient manner without unduly interrupting activity flow. This also implies that a teacher identifies a balance for individual and whole class learning.

The common class activity approach provides many benefits for efficient and meaningful learning. Both the student and teacher can be confident of the likely outcome of each instructional step enabling all students to be potential peer-mentors. A common set of core skills for the class enables all students to participate in group based social learning activities such as Compositional Chairs (Hubmayer, 2010a).

Introduction to *Boomacious*

The introduction provides a brief overview of the learning focus and intended outcomes for the *Boomacious* learning activity. Technical requirements are discussed, as well as a brief summary of how to use the AID instructional design model. A scenario is provided that contextualises the learning activity within a model of authentic practice. This scenario provides initial focus and grounding for the learning activity, but its emphasis intentionally fades as the activity progresses. This reflects a shifting of emphasis towards the development of musical concepts and editing processes. Reference is made to additional teaching information situated at the end of the learning activity PDF. These have been positioned at the end in order to focus learners immediately upon the learning activity rather than extraneous teaching information.

The scenario provides the teacher with an opportunity to facilitate a class discussion in order to gauge current student understandings regarding what a 'demo' is and how it may be useful, as well as to provide learners with advanced organisers for what the anticipated learning and outcomes for this activity may be. This is likely to involve guiding students through an overview of the activity resources, with a highlighting of the assessment process and the self-directed extension opportunities.

Experimentation

This stage is divided into two sections. Part 1A guides the learner through the software process skills of creating a new project and inserting the plug-in virtual instrument Boom. The 15 steps are procedural and introduce the learner to the AID concept of differentiated levels of instructional depth. As no pre-load template is provided, this step is important for creating a project session to build their drum beats within. The first *experimentation challenge* is contained within section 1B and, through an active process of exploration and experimentation, the learner tries out general aspects of the Boom drum machine, while seeking solutions to four tasks: changing patterns; selecting preset styles; changing drum kit sounds; and adjusting the pattern tempo. It is intended that the learners use the design ‘affordance’ or the ‘self-evident’ structure of the Boom instrument to construct their own understanding of ‘what-does-what’. Peer discussion is encouraged through a process of explaining why they like particular patterns. It is suggested that a teacher sets a time limit for the challenge activity, perhaps 5 minutes. A teacher facilitated and student focussed skills summary is suggested to clarify understanding and encourage further dialogue regarding process skills. Discussion should emphasise the musical effect created by the challenge steps and questioning should draw out the musical understanding of how learners think this process or effect could be applied in music making.

Modification

Section 2A introduces the fundamental software process skills for opening the *Boomacious* session created in section 1A. As this learning activity stretches over 5-6 lessons, it is important that the fundamental steps of starting the Pro Tools software, opening and saving their *Boomacious* project, are addressed. Section 2B sets another series of task challenges to modify an existing drum beat pattern using a guided discovery and exploration process which encourages trial and error, peer discussion and peer assistance. The *modification challenge* tasks include activating the pattern edit switch, entering beats on the timeline, selecting drum sounds and modifying their beats, muting and soloing drum sounds, as well as copying patterns.

Teacher pedagogical considerations should include setting a time limit for the activity, minimising whole class intervention, observing student work habits, solving technical issues, (headphones, adaptors), and helping individual students by suggesting learning and workflow strategies. A teacher facilitated student summary is expected in order to clarify student understanding. A movie is also provided to demonstrate one possible approach to completing the *modification challenge*.

Deconstruction

This *Deconstruction* stage directs the learner to critically analyse how the preset patterns can be combined to create variation and development through the use of texture and rhythm. A series of detailed worked examples demonstrates key concepts and processes and students actively experiment within the suggested guided parameters.

This stage of the learning activity has been organised into seven sections. Section 3A is a process step for opening the *Boomacious* session. Section B models a deconstruction process applying a number of the challenge skills developed in the Experimentation and Modification stages and applies it to editing the instrument patch used for the *factory default pattern*. Students are guided to use their aural perception skills to decide the appropriate kick drum tonal properties such as instrument sound, tuning, decay, panning and volume balance. Section 3C presents a *construction challenge* that directs the learners to follow the same deconstruction process used in section 3B and adjust the same tonal properties for the snare, clap, closed hi-hat, and crash cymbal. It is suggested that a teacher sets a time limit for this to encourage focus and that time is allowed for students to hear one another's instrument patch.

Section 3D introduces the concept of 'pattern chaining' which is joining together a one measure drum pattern with one or more other patterns to create a longer repeatable phrase, thereby creating more rhythmic variety. Another *construction challenge* is featured in section 3E, directing the learner to apply these chaining skills to create their own four or 8 measure pattern chain using the *default pattern*.

Students create their own *pattern preset* in section 3F and the focus is principally about software process. A series of guided steps directs the learner to rename and save an existing preset pattern, so that any changes they make to the rhythmic patterns or instrument sounds can be reloaded should they close the session project or experiment with a different drum pattern. This saving process is also transferable to other Pro Tools virtual instruments such as Vacuum and Xpand2.

Section 3G deconstructs the *factory default* first rhythm pattern and models a process for pattern copying, deleting and adding rhythm notes, using the *pattern matrix*. This process model is best represented by a pyramid structure where initial rhythmic simplicity is gradually increased through each subsequent pattern. A feature of this approach is that an overarching stylistic connection is maintained between each pattern and students of all ability levels are more likely to produce effective musical results. There are twenty-three steps to this section and regular saving of the *preset pattern* is required.

This guided and detailed approach is important as the activity is designed to support independent student learning, while also providing a common base level of process skills and terminology to enable meaningful interdependent peer learning and whole class discussion.

The ambiguity of using section titles such as *Construction Challenge* and *Constructing Your Own Pattern Preset* within a stage titled *Deconstruction* is intentional, as it highlights the recursive and cyclical process of practical music making, critical analysis, and modification.

Construction

Part 4 is the *Construction* stage and within this section the learners apply their current knowledge and skills to construct their own instrument combination and rhythm patterns. This is a self-directed, individual learning activity in which students apply the process model used in section 3G. A list of focus activities is presented which serves as both an outcome expectation, as well as an organisational aid. Peer listening and discussion is encouraged to provide both inspiration and feedback support. The *preset pattern* they create during this *Construction* stage is then intended to be used as the basis for their future work within the *Application* stage (Part 5).

Application

It is intended that students demonstrate within the *Application* stage how they can use their software process skills in a musically creative and effective manner. For *Boomacious*, the most effective and authentic approach is to record 40 seconds of music using the sounds and rhythm of their own *pattern preset* and then mix and export this as a digital audio file (.wav) To achieve this using Pro Tools, learners with fundamental Music ICT skills require significant instructional support and guidance. This *Application* stage is divided into four sections which guide the learner through a MIDI recording process.

Section 5A introduces the concept of the MIDI *Track Notes View* and demonstrates how the Boom rhythm patterns are connected to the keyboard interface. A number of procedural software steps prepare the Pro Tools arrange window and *Track Notes View* ready for MIDI recording and the project session is saved.

Section 5B introduces the pencil tool for manually drawing MIDI notes that trigger the Boom rhythm patterns to play for as long as the MIDI note is drawn (sustained). The learner is guided through a process for combining different rhythm patterns into a musical phrase that can be repeated or varied as required. Critical listening is emphasised so that considered musical choices are made in preference to random pattern entries. More advanced MIDI note drawing features, such as beat, silence and switching patterns are also presented. The learner is then required to work independently to assemble their own 40 second musical piece using the demonstrated editing processes. A renamed progressive save is then required.

Section 5C introduces the concept of creating additional musical interest through phrased cymbal accents, as well as additional instrument sounds not contained within the Boom rhythm patterns. Advanced editing techniques such as velocity lanes and drag copying are also embedded in the guided process. Another renamed progressive save is then required.

The final section of the *Application* stage (5D) is the *Mix Down* of the *Boomacious* MIDI drum machine track to an audio wave file or what Pro Tools calls the *Bounce to Disk* process. This section guides the learner through the process of exporting the assembled drum music from the Boom drum machine and then having it played back using another media player (iTunes).

Reflection

This stage provides a structured assessment and evaluation framework that draws upon the changing notions of learning and assessment outlined by Norton and Wiburg (1998). Students are provided with the opportunity to reflect upon their learning through a process of summarisation, explanation, and rubric based self-evaluation and peer-evaluation.

Section 6A guides the learner through the creation of a word processor based evaluation commentary document. The intentions behind having students create their own document rather than providing a template is to encourage the learner to own, build and personalise their evaluation commentary.

Section 6B supports the learner to demonstrate visual evidence of their learning by guiding them through a process of taking screenshots of their Pro Tools *Boomacious* session and pasting this into their *Evaluation Commentary*.

Section 6C is the critical reflection and evaluation of their *Boomacious* work. Six key questions are provided and the learner is expected to provide at least 3 valid points for each of the questions. This builds upon the peer discussion and explanation process used within the *Challenge* activities. The second section is a personal and peer graded evaluation of the *Boomacious* audio recording and commentary document. An evaluation rubric is presented with specific features listed and indicators provided on a marking scale of zero to 2. The total mark is 32.

Section 6D requires the learner to follow their teacher's direction for submitting their audio mix down with their self and peer evaluated commentary to the subject teacher for feedback and grading confirmation.

Extension

This final stage is intended to move the student beyond the heavy scaffolding of guided instructions and encourage them to create their own music in a self-directed and self-regulated manner. It draws upon the learning philosophy expressed by Bruner (1973) that learners and educators should go beyond the information given.

The initial six stages of the EMDCARE framework guide the learner through a knowledge construction process that could be regarded as 'minimum' skill competencies. The extension section provides the opportunity for students to demonstrate deeper musical understanding through including skills, processes and techniques that may not have been included in the guided *Boomacious* activity. Twelve musical techniques are suggested for inclusion within a 1 to 2 minute electronic drum-solo piece. Evidence of learning is provided through an audio wave file and a commentary document containing project screenshots and a commentary explanation.

How many students progress to this final level is likely to be dependent upon the following factors: student interest, student working pace, the number of provided lessons, as well as teacher and peer encouragement.

Teacher’s Notes

This concluding section expands upon the Introduction to *Boomacious* (page 1 of the PDF) and explains to the teacher the purpose and learning design of of the instructional resource. A range of teaching strategies and assessment considerations are discussed, in addition to an overview of the *Boomacious* activity and a summary of the tasks contained within each activity part.

4.4 Significance of work

The significance of *Boomacious* as an instructional resource is built upon its pedagogical and philosophical foundations. *Boomacious* is a multifaceted instructional resource that has been designed to demonstrate that constructivist, constructionist and guided instruction learning design can be effectively blended to promote student learning and the construction of musical knowledge and understanding. In that respect, its purpose is significantly different to existing published Music ICT instructional resources. Its deeper significance lies in the demonstrated application of the EMDCARE learning framework and the AID instructional design model.

The practical usefulness of *Boomacious* as a pedagogical instructional resource is related to its specific and detailed design structure, which is highly relevant for this current version of the Pro Tools software. Unfortunately, like all other Music ICT instructional resources, this specificity becomes its inbuilt obsolescence. With each annual software upgrade, new audio, MIDI and layout design improvements will reduce the relevance of this current version of *Boomacious*. To retain its instructional usefulness and relevance, *Boomacious* would also need to be refined and upgraded to reflect the new possibilities available within future upgrades to the Pro Tools music software.

At its simplest level, *Boomacious* provides structured, sequenced and directed learning suitable for novice and fundamental learners new to this software and musical composition approach, ensuring that learners can 'quickly' get-up-and-running creating music using the virtual instruments contained within Pro Tools. If learners and teachers were to disregard the constructivist influenced pedagogical activities and approach the instructional resource as a series of procedural tutorial steps, learners are likely to develop software skills and musical understanding similar to many other instructional resources. When used as intended, *Boomacious* becomes a far more powerful tool for learning and teaching using Music ICT, as it incorporates personal discovery and exploration, the social negotiation of understanding through peer interaction and explanation, as well as personal reflection and appraisal through the assessment process. None of these features are unique or unusual to Music ICT instructional materials. Rather their significance lies in their learning intentions and their likely combined effect upon the learners' construction of musical knowledge and understanding.

The EMDCARE constructivist learning framework that underpins *Boomacious* offers promise for providing an alternative way for considering and conceiving Music ICT pedagogy. The EMDCARE framework could readily be applied to teacher directed real time instruction without the need for multimedia style guided instructional activities. Table 25 provides an example of the EMDCARE learning framework being applied to instructional guidance for a generic reverb plug-in (fictitiously titled *Reverbacious*) typical of any music software program. It could just as readily be applied to a music notation software program or a hardware based synthesizer or guitar looping effects pedal.

Table 25: Reverbacious - EMDCARE model

Experimentation	Teacher provides a template session that includes: • audio wave recording of a single handclap that is 8 beats duration. • *Reverbacious* plug-in inserted into this track, containing a range of preset configurations • A list of focus 5-10 challenge questions that direct students to discover such things as how to select and change reverb presets, loop the audio, rename and save a preset patch etc.. • A time limit is set for students to explore • Class discussion clarifies how to perform the challenge questions
Modification	Students select any preset patch from *Reverbacious* and adjust 2 or 3 nominated values e.g room size, dry/wet balance. They modify patches through a trial and error process to simulate the sound of a small, medium or large space. A time limit is set and students listen to each other's best efforts through a headphone rotation
Deconstruction	All students select a common *Reverbacious* preset patch that the teacher has identified as suitable for in depth analysis. The teacher guides a student demonstrator through a worked example process that provides an overview of key concepts and critically analyses how each parameter affects the processed sound. Inserting reverb onto a new audio track would also be included. The class mimics the process using headphones to personalise the deconstruction steps.
Construction	Students create their own reverb patch based upon a teacher or class developed criteria list. The final patch would be named and saved.
Application	Students create an audio mix down containing dry and wet *Reverbacious* settings that creatively illustrate the benefits of using reverb
Reflection	Students listen to each other's work in small groups and discuss how their constructed patch demonstrates the criteria list.
Extension	Students select their own audio samples and creatively add a range of reverb processes across a range of tracks that are intended to demonstrate a musically effective example of using reverb plug-ins.

This *Reverbacious* learning activity illustrates how the EMDCARE framework keeps the learning activity from becoming a teacher 'show and do' demonstration and makes deeper learning and the development of musical knowledge and understanding more likely. This activity is likely to occupy two lessons, but it could be condensed into one very fast paced lesson. It should be noted that to present such a learning activity, a teacher would require preparation time to create a suitable template, explore the affordances of the reverb plug-in, consider challenge questions, plan a structure for the lesson, and ensure teacher and student computers were prepared and functioning correctly.

The other significant aspect of the *Boomacious* instructional activity is the multimedia based Amplified Instructional Depth design model. The AID instructional design model provides a systematic and flexible approach for preparing guided instructional materials within a single scaffolded learning structure that accommodates and allows for students with different levels of prior knowledge, preferred learning styles and different learning motivations. This design model could readily be applied to other school curriculum subject areas that support student learning and knowledge construction through the use of worked examples or guided instruction strategies.

4.5 Recommendations and Conclusions

This research recommends that further exploration and critical examination of the EMDCARE learning framework and AID design model is warranted in light of the demonstrated success of its application in *Boomacious*. The research model currently resembles an action research approach, with student use and teacher trialling offering the only opportunity to test and refine the instructional resource. A more critical examination that employs the use of learning control groups with measurable control variables may determine to what extent the learning framework and the learning design model contribute to student learning and understanding. Additional research that applies the framework and model to a variety of non-music subjects may also determine the transferability of the framework and design model

This folio section has demonstrated that constructivist influenced learning design and guided instruction models can effectively and successfully be combined to support student learning within a Music ICT learning experience. The *Boomacious* instructional resource has illustrated one way of applying the researcher developed EMDCARE learning framework and AID learning model in the classroom context, while other applications and approaches have been suggested.

In terms of creating and educational resource *Boomacious* demonstrates that designed musical learning experiences can be represented in a range a ways and that promoting musical understanding through guided learning activities offers considerable promise for further pedagogical and curriculum development in Music ICT instruction.

Research Portfolio Conclusion

The Secondary School Music Curriculum: An investigation of designed learning experiences that promote musical understanding

5.1 Conclusion Outline

This folio has investigated three distinct and contrasting approaches to designing musical learning experiences within a secondary school music curriculum. This conclusion considers the implications of designing music learning experiences based upon the findings of these three studies.

The portfolio introduction outlined the background literature that provides the theoretical bases for considering music education and the promotion of musical understanding from the perspective of a designed musical learning experience. These theoretical bases were: learning and teaching through experience (Kolb, 1984; Dewey, 1938); learning and teaching for musical understanding (Wiggins, 2009); and designing learning that makes more likely the construction of certain understandings (Wiggins and McTighe, 2006; Reigeluth, 1999). Based upon this body of literature the following key definitions were proposed as a way of framing the research folio:

- A music learning experience is when a person's current musical understanding is affirmed, enhanced or challenged.
- Designed music learning experiences are those where the teacher engages in intentional and direct planning to support student construction of knowledge, understanding and meaning.

These definitions provide a broad basis for considering a range of environments, activities and experiences that can be considered as opportunities for musical learning. For teachers, this means identifying what musical outcomes they are seeking and then designing learning experiences that make these learning outcomes more likely. This portfolio has researched the following three topics, using this designed music learning perspective.

Folio Topic 1: Music ensemble competitions as designed music learning experiences: an examination of the role of ensemble competitions within the secondary school music curriculum and student perspectives on participating in ensemble competitions.

Folio Topic 2: Teacher pedagogy within designed Music ICT learning experiences: examining the pedagogy of secondary classroom music teachers with regard to an extended music remix classroom activity using ICT.

Folio Topic 3: The creation of a Music ICT instructional resource that demonstrates a constructivist influenced Music ICT learning framework and design model.

Each folio topic has been presented as a discrete piece of research, following traditional thesis structures. Consequently, each topic has already presented a conclusion containing specific research findings and recommendations, and in the case of Folio Topic 3, a discussion establishing the significance of the educational resource created

Therefore, this portfolio conclusion explores the implications of designing music learning experiences, based upon the findings of these studies, by considering how they contribute and relate to:

- Student learning.
- Promoting musical understanding.
- Pedagogy and classroom practice.
- Secondary school music curriculum.

5.2 Implications for Designing Music Learning Experiences

The three folio topics are discussed separately, using the aforementioned headings and a range of learning and design implications are considered.

5.2.1 Music Ensemble Competitions

This first research folio examined the role of music ensemble competitions within the secondary school music curriculum and explored student perspectives on participation in competitions. Amongst a range of research findings and recommendations, it was identified that music ensemble competitions were likely to produce a unique combination of motivational factors which legitimised to students the need for devoting greater time and effort towards 'doing their best'. When this motivation was directed into a process of sustained training and development, focussing upon improving personal and ensemble musicianship, the ensemble competition experience was more likely to lead to improved musical outcomes in the short and long term.

The researcher proposed that an ensemble's participation in a music competition provides an ideal vehicle for a music teacher or ensemble director to design a musical learning experience that not only addresses the need to improve personal and ensemble musicianship but also supports student construction of musical knowledge, musical understanding and musical meaning.

Student Learning

Findings from this research study indicated that participation in ensemble music competitions created for students a unique short term learning motivation that could be directed towards designed learning experiences that provided the potential for continued musical growth and development. This learning motivation was important, as research literature indicated that for learning to occur, students should be attentive and motivated towards considering and constructing meaning and understanding from what they were experiencing or had experienced. Prolonging and sustaining this learning motivation was where a designed learning structure could provide a greater richness of material to assist learners to make more complex and deeper connections between their understanding of musical concepts, and the skills based practice required to represent these understandings in a public performance.

Within this research, students identified that the most important things they thought they should be learning from a music ensemble experience were: group playing skills; development of instrumental/vocal technique; performance skills; rehearsal skills; and knowledge about musical styles. As all of these can be learnt without participating in an ensemble competition, this research proposes that it is the collateral learning associated with preparing for and participating within the competition that makes the formation of attitudes of likes and dislikes more important and enduring than the immediate learning experience (Dewey, 1938). This implies that the design of the learning experience should not only attend to the musical skill development of the individual and the ensemble but also model a healthy perspective regarding social values, attitudes and beliefs. This collateral learning could include such things as goal setting, work ethic, cooperation, social interaction, team building, and understanding the nature of competitions and competing.

Promoting Musical Understanding

This research folio has emphasized that musical understanding is a capacity to comprehend and connect our musical experiences (Zenker, 2002), such as the ability to anticipate and predict patterns, as well as a process of developing accuracy and complexity within musical explanations (Bartel, 2002). Therefore, to promote musical understanding is to design opportunities for students to consider and reflect upon their musical experiences and to provide 'thinking time' to encourage more complex 'connections' with their existing musical understandings through the process of affirming, enhancing or challenging these understandings.

The rehearsal process leading towards the ensemble competition, as well as the competition event itself, can provide many music learning experiences that could be used as a basis for guided discussion and reflection. These may include: discussion of competition judging criteria; identification of specific practice strategies to develop musicianship techniques (rhythm, expression, intonation, blend, etc..); guided listening analysis to recordings of the ensemble in order to identify performance strengths and areas of improvement; and analysis of 'exemplar' performance recordings. This discussion and reflection process should encourage the learners to consider what happened, why it happened, what they learned, and how they should apply this knowledge to future musical experiences (Lindsey and Berger, 2009).

The competition process itself promotes the formation of stronger musical understanding through listening to other ensembles, being exposed to a broader range of repertoire and consideration of the feedback provided by an external adjudicator. Students indicated that other benefits of being in an ensemble competition were seeing, hearing, and interacting with students from other ensembles; and for many, the experience encouraged greater application towards striving for higher standards of performance.

Pedagogy and Classroom Practice

Recommendations from this research proposed that in order to provide a rich and motivating environment that can sustain continued musical growth, ensemble directors should consider designing a range of learning experiences that were spread across the ensemble year, participation within an ensemble music competition being but one of these. Other recommended learning experiences included: non-competitive performances, collaborative performances and rehearsals, performance tours, music learning camps, excursions to concerts, circulation of a repertoire CD, guest conductors, student conductors, sectional rehearsals, small ensemble quartets and septets, peer tutoring, and making connections with the broader community. Many of these experiences complement and enhance the learning potential of participating within a musical ensemble competition.

Further findings recommended that musical directors should expect competitions to motivate student participants and plan to use this short-term focus to design longer-term learning enthusiasm. A range of pedagogical strategies were suggested including: the director and ensemble jointly creating identifiable performance specific indicators of success; setting achievable performance goals such as accuracy, expression, and intonation; varying repertoire through sight reading simpler music; building support mechanisms that may include extra rehearsals, sectional rehearsals, and practice towards personal bests; pre-competition 'warm-up' performances; recording performances; discussing and reflecting upon ensemble progress towards practice and performance goals; and celebrating post competition with a public performance that is used for recruitment and retention.

Secondary School Music Curriculum

It is important to recognise that school based music ensembles exist within a social context that creates competition for students' attention and time. Any 'additional' event impacts school timetabling and family schedules; therefore, an initial implication for participating in an ensemble music competition is ensuring that students within the ensemble, their families and the school community are motivated towards supporting the event and committing to the likely time requirements. Compromises may also need to be made through the reduction of other music curriculum and co-curricular activities to 'free-up' additional 'learning-time' for the ensemble competition students.

Further consideration would also need to be given to a balanced performance calendar particularly in light of the research findings indicating that students were more motivated by competition performances than by non-competitive performances and that rehearsal attendance and instrumental practice peaked at the time of the competition. The implications of this support the learning design strategy of maximising the learning benefits created by the short-term competition motivation and recognising that additional non-competitive based motivation may be required for later performances.

5.2.2 Music ICT Pedagogy

The second research folio examined the pedagogy of teachers as they designed and taught an extended music remix classroom activity using Music ICT. A broad range of qualitative data was assembled and using a researcher developed dual lens analysis model, the following three research questions were addressed.

- What are the teachers' pedagogical considerations during this learning experience?
- Can specific examples of pedagogical content knowledge unique to Music ICT be identified?
- To what extent does the pedagogy reflect constructivist influenced teaching strategies?

Based upon the evidence presented in this study, the research findings suggested that teachers who could articulate a learning philosophy, as well as design their own instructional resources, tended to demonstrate pedagogy likely to lead to deeper student learning. Other findings indicated that teachers used constructivist influenced student-centred teaching strategies 75% of the time, and that unique Pedagogical Content Knowledge was most evident when teachers regularly connected musical concepts to software specific processes which could then be applied to produce an appropriate musical outcome.

This research led to a range of recommendations that provided guidance for designing Music ICT learning experiences. The implications of these recommendations are now discussed.

Student Learning

Findings from the Checklist for Pedagogical Constructivist Depth suggested that students were likely to adopt a deeper approach to learning, using Music ICT, when they were provided with instructional resources that contextualised and enabled authentic and personalised representations of musical concepts. The findings also identified that a guided learning approach providing explicit learning process steps supported by specific software examples, was also likely to support a deeper approach to student learning. This implies that the sooner students could personalise a learning project, the more likely they were to demonstrate deeper approaches to learning. This required that the teachers' pedagogy and the manner in which they directed students to use the instructional resources, should support student personalisation and customisation of the learning experience.

This research found that student learning was enhanced when using Music ICT by connecting musical concepts required for the learning activity (such as: pitch, duration, rhythm, texture, tempo, form, dynamics, expression etc..) with software specific process skills (such as: grid edit screen, drawing tool, quantize and snap, patch change, track blending, automation tracks, arrange screen, velocity, controller automation, modulation, and drawing tool). This process was likely to introduce greater complexity and richness to their musical knowledge and understanding by affirming, enhancing or challenging their views of how musical concepts could be represented and created.

Promoting Musical Understanding

This research suggested that musical understanding could be promoted in Music ICT learning experiences through a process of designed social interaction that provided structured opportunities for students to listen, explain, and discuss their musical work. The focus or intention of this interaction was to expose students to alternative viewpoints and representations of the learning activity and to stimulate self-reflection through explaining and discussing the musical concepts evident within their work. This process was designed to use the peer and group dynamic of the classroom environment to promote student construction of musical knowledge, understanding, and meaning. The classroom implication of this increase in social-learning time was, as expected, reduction in students' individual-learning time. However, this research suggested that this was a worthwhile compromise as this process was likely to promote deeper musical understanding.

Music ICT assessments are another way of promoting musical understanding. This study found that most Music ICT assessments evaluated student understanding through summative tasks and reflections, but these were often compromised by changes in lesson schedules and by student absences. Multiple and interwoven assessment strategies that complemented and were in addition to summative models were recommended as being more likely to provide multiple representations of student understanding. These strategies included, checklists for competency based skills, discussion and explanation, and student process journals.

Pedagogy and Classroom Practice

This research topic examined the pedagogy of ten secondary classroom music teachers and the findings indicated that these teachers possessed a range of specialised Music ICT Pedagogical

Content Knowledge that was unique for teaching Music ICT and which enabled some teachers to be more effective with their learning design and classroom pedagogy (see section 3.7.1 p.272). It was suggested that this specific pedagogical knowledge was constructed through a prolonged or continuing teacher learning process that was likely to include professional pedagogical training, general ICT training, regular hands on experience creating music using Music ICT, mentor support, regular teaching experience designing learning using Music ICT, and professional dialogue and reflection.

This study also explored the notions of deep and surface approaches to student learning being linked to the pedagogical design of teachers. A Checklist for Pedagogical Constructivist Depth was developed and used as an analysis tool. The findings indicated that, although teachers represented constructivist influenced student-centred teaching strategies 75% of the time, not all approaches to pedagogy or instructional design were likely to lead to deeper approaches to student learning.

This research observed that teachers who were able to articulate a learning philosophy were more likely to consistently represent this within their teaching pedagogy. This consistency was more likely to provide a broader range of opportunities for students to adopt deeper approaches to learning through the alignment of resource design, instructional pedagogy, and learning assessment.

A practical recommendation from this study was that teachers who regularly create music using Music ICT tools can improve and maintain their Music ICT proficiency. The study found that teacher proficiency with Music ICT was a factor in designing greater student choice and personalisation within the design of the learning activity and instructional resources. This enabled the teacher to present skill development activities using a range of instructional strategies. These included: teacher coached student demonstrations; teacher facilitated whole class listening and discussions; small group or peer listening and explanation; peer coaching, designed collaboration; teacher-centred whole class demonstrations; step-by-step 'show and do' demonstrations; direct instruction; and individual sequenced learning.

Another pedagogical recommendation was that teachers create Music ICT learning plans that were realistic in scope and breadth to allow enough in class lesson time to complete the learning activity, as well as provide sufficient milestones to acknowledge measurable learning progress.

Secondary School Music Curriculum

This research identified that the use of Music ICT within the secondary school music curriculum occupied approximately 25% of class time (see figure 60: Music Technology Use By Year Level) and that its use could be employed in a number of ways to support a range of learning needs (see Figure 58: Music Technology Most Important Uses). Of interest was the view that Music ICT and in particular Audio/MIDI software was regarded as a powerful learning tool, as it did not necessarily require music notation skills to create music. Further findings suggested that the use of Music ICT increased throughout secondary schooling (see figure 59: Music Technology Use By Year Level), and that Audio/MIDI and Notation based composing and arranging software were regarded as the most important uses for Music ICT within the secondary school music curriculum.

5.2.3 Music ICT Instructional Resources

The third folio topic presented the creation of an educational resource titled *Boomacious*. This is a constructivist influenced, instructional resource for secondary school Music ICT that also serves as a demonstration model for a researcher developed learning framework (EMDCARE) and an instructional design model (AID). The third research folio topic outlined how this approach to designing Music ICT instructional resources supported student construction of knowledge, understanding and meaning, and how such guided learning activities offered considerable promise for further pedagogical and curriculum development in Music ICT instruction. This concluding discussion now considers the implications of designing Music ICT learning experiences that employ the EMDCARE framework and AID design model, with reference to the *Boomacious* instructional resource.

Student Learning

At its most fundamental level, *Boomacious* provides structured, sequenced and directed learning suitable for novice and fundamental learners. Its specific and detailed design structure makes it more likely that, with minimal teacher guidance or intervention, learners can successfully create a drum machine-based music composition using the virtual instruments contained within Pro Tools. Although this independent guided learning approach is a popular tutorial pedagogical model (see Table 23: Music ICT Instructional Resources Analysis), and is likely to produce successful learning up to a certain level of understanding, *Boomacious* is designed to encourage learners to adopt a deeper approach to their learning through designed discovery and interdependent peer learning.

Boomacious is based upon the EMDCARE learning framework which provides the learner with greater responsibility and opportunity for experimenting, discovering and explaining their understanding as to the purposes and uses of a device/process/concept (see section 4.3.3 p.339). The EMDCARE framework employs a socially negotiated discussion process in which students' knowledge and understanding are affirmed, enhanced or challenged. The importance of this constructivist learning approach is that learners construct their knowledge and understanding through a constructionist 'making' approach (Papert and Harel, 1991), while also checking and clarifying their understanding using a social constructionist discussion model (Vygotsky, 1978).

Another important structural element within *Boomacious* is the AID design model which provides explicit instructional guidance using different levels of instructional depth (see section 4.3.4 p.341). *Boomacious* illustrates this instructional depth process in the following way: succinct learning directions are initially provided in bold font; these directions are then elaborated using more specific detailed instructions using an italic font; a screenshot picture highlighting the software specific process step is provided as a visual reference; and a movie demonstration employing voice, text and visual images combines a number of steps, placing the learning directions into a musical context.

The learning implication of this design model is that students are empowered to select the amount of instructional assistance they require in order to complete a learning step. Should their prior knowledge and understanding enable them to readily complete the directed learning step, then they may disregard the elaborated detail and move forward to the next guided learning step. This helps make learning more efficient and is less likely to result in learner fatigue due to redundant learning information (Sweller, 2005).

Promoting Musical Understanding

As a designed Music ICT learning experience, *Boomacious* promotes musical understanding through an active and guided learning process in which students are given the opportunity to consider how their practical creation of an electronically-based musical rhythm represents a range of musical concepts. The EMDCARE learning framework that underpins the *Boomacious* resource provides the leaner with a powerful tool for learning using Music ICT. By design, it encourages personal discovery and exploration, the social negotiation of understanding through peer interaction and explanation, and explicit linking of musical concepts with software processes. In addition, a personal reflection and appraisal assessment process provides "thinking and discussion time" to encourage more complex connections within students' existing musical knowledge by affirming, enhancing or challenging their musical understanding.

s; notation based composition projects; and web-page based personal reflections.

This research has identified that important curriculum considerations for designing Music ICT learning experiences include: allowing sufficient teacher experimentation and preparation time for designing detailed instructional resources; providing sufficient student learning and thinking time to complete learning experiences; and designing instructional resources so that they can readily be updated and made applicable for students in future years.

5.3 Portfolio Summary

This portfolio has explored the perspective that secondary school music education could be considered as a learning design process in which music teachers create learning experiences that, by design, make the construction of certain knowledge, meaning, and understanding by students, more likely. This constructivist influenced research perspective has been examined within three discrete portfolio topics. Each topic provides a unique perspective for considering how the learning design, pedagogy and student learning can be represented within the secondary school curriculum as designed musical learning experiences.

This research perspective has indicated that music ensemble competitions provide unique learning motivation for students that can be directed into designed learning experiences that make more likely the development of improved performance skills, musical knowledge and musical understanding. The perspective has also identified an important connection between Music ICT Pedagogical Content Knowledge, constructivist influenced student-centred pedagogy, and the development of Music ICT instructional strategies and resources that are likely to lead to deeper student learning. This research perspective has also produced the EMDCARE framework and AID design model demonstrated within the *Boomacious* instructional resource. Such guided learning activities offer considerable promise for further pedagogical and curriculum development in Music ICT instruction.

The results and findings from each folio topic seem to be robust and certainly have face validity in terms of the researcher's practical teaching experience. Based upon the findings from this research, the researcher has begun to explore further applications and frameworks for designing musical learning experiences (Hubmayer, 2011) [see appendix 47]. This particular research perspective for music education has not been subjected to as much scrutiny as some other and if these portfolio results and findings can be replicated in other settings, they have significant implications for the design of music programs and their implementation.

The significance of this portfolio and its unique contribution to music education lies in its operationalizing of constructivist learning theories and shifting the pedagogical emphasis from planning music teaching, towards designing musical learning experiences.