PRIMARY SCHOOL CREATIVITY AND COMPOSITION
IN A PROFESSIONAL LEVEL MUSIC SOFTWARE
ENVIRONMENT

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Submitted in partial fulfilment of the requirements for the degree of Master of Information Technology in Education in the Faculty of Education at the University of Melbourne

2001
Dedication

I dedicate this dissertation to the memory of
Rev'd James Henry Reynolds LRAM ARCM
31-12-1919 to 7-10-2001

Musician, teacher, clergyman and father.

He would have been proud and happy.
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Declaration of Originality

This dissertation contains no material that has been accepted for any other degree in any university. To the best of my knowledge and belief, this dissertation contains no material previously published or written by any other person, except where due reference is given in the text.

Signed

Nicholas James Reynolds

Date 19th December 2001
Acknowledgements

I wish to acknowledge the help and support of the following people and organisations, without whom this study could not have even begun:

Mary Reynolds

Peggy Aspinwall, Syntrillium Software for providing copies of Cool Edit 2000

Michael Carr, Cakewalk for providing copies of Cakewalk Pro Audio 9

Ken Owen, SoundHouse for the use of a keyboard and midi cables

Rod Hysted, Healesville Primary School for the use of midi keyboards

The participants, their parents and the school in which the study took place

Dr Anne McDougall for her sympathetic and supportive supervision

Thank you all.

Nick Reynolds
Abstract

This paper provides an investigation into the use of professional level music software as a learning tool for creativity and composition in primary school children. The researcher believed that music and sound editing was under-used in schools and that children could:

- Work successfully with that type of software
- Work creatively with the software
- Benefit from its use

A small case study was used to expose the participants (eight children from Grades 3 - 6) to two professional level music software applications: Cakewalk Pro Audio 9 and Cool Edit 2000. The children explored the software and completed set tasks over a ten-week period.

Data, in the form of the students’ work, taped copies of all sessions, interviews and researcher reflections, were analysed to present an understanding of the creative and compositional processes and products. In addition, all student pieces were recorded onto CD.

The analysis of data suggests competent use of both software applications as well as satisfactory completion of set tasks. The data also indicate that the participants were able to operate at compositional levels beyond their age and musical skills and knowledge. Conclusions are drawn to suggest that, in this case, the use of this software has assisted the creative process and has allowed these children the opportunity to
compose and construct pieces that could not have been constructed without the software.

In conclusion, the researcher reminds the reader that any decisions regarding the implementation and development of computer based music making in schools, must be made with due consideration being given to cost, equipment and overall benefit. The researcher encourages teachers to explore this area, but to understand that any tool is only of value if it is used appropriately and for the correct reasons.
CHAPTER 1

Introduction

Imagine the suggestion that we invent a special language to help children to learn to speak. This language would have a small vocabulary of just fifty words, but fifty words so well chosen that all ideas could be expressed by using them ... Perhaps the vocabulary might be easy to learn, but the use of the vocabulary to express what one wanted to say would be so contorted that only the most motivated and brilliant children would learn to say more than "hi." (Papert 1993 p. 35)

The Problem

The use of computers in the generation, creation and editing of music in schools seems to be a largely untouched area of educational computing. Children in rich computer environments are exposed to programs that allow the creation of pictures, text, sound, video - all areas of multimedia, as well as simulations and games that explore many varied curriculum areas. If one is to look into the sound aspect of multimedia, it is more than likely that the sound component is restricted to single track waves recorded at very low quality frequency (11kHz), pre-recorded sound clips (midi, wave or mpeg) or use of teacher generated files.

Questions about this situation need to be asked. Why do we place children in a rich computer environment with state of the art equipment and programs and deprive them of the creative aspect of music? Why do programs that can be used for multimedia development to a very high level, such as HyperStudio, MicroWorlds and PowerPoint, fail to provide adequate audio editing? Perhaps the most important questions are "what
can be done about it?" and "can children and teachers be taught to use high-end, professional level music programs in a task appropriate manner and in consideration of age, computer literacy and musical ability?"

I use the term 'computer literacy' in its popular form, aware of what diSessa says about:

... the shameful debasing of the term literacy implied in essentially all conventional uses of computer literacy – as if a casual familiarity with any chunk of hardware that in any sense computes might do for humankind something comparable to what the written word has done. We need to be much more accountable in saying when and how certain materials, computers among them, might convey enough intellectual power to be likened to textual literacy. (diSessa 2000 page 109)

The questions above inevitably lead to further questions regarding the need to include music writing and editing in a primary school environment. The degree of sophistication and depth required in the use and scope of high-end applications needs to be examined, as do the particular programs in question. I have no doubt that even if my research provides evidence that children and teachers can work in this kind of technical environment, equipment restrictions as well as physical space restrictions may deter teachers from embracing my proposal. On top of these restrictions I am also aware, from my own experience as a primary school music teacher, that implementation of this type of thinking and practice may not receive widespread acceptance in an environment where the teaching of both primary school music and computers are often viewed as difficult disciplines requiring special skills.
I acknowledge the inherent difficulties of teaching children to master complex computer applications but these difficulties form part of the study. It must also be acknowledged that while a level of mastery of the programs is essential to the study, the programs themselves can only be viewed as a means to a creative end, not the end itself. The following questions must, however, be asked:

Can a learning environment be established where the children will be able to:

- embrace the technology?
- understand the interface?
- grasp basic concepts of recording and playing?
- work within a new and complex software environment?

**Statement of the Research Question**

This project asks:

“In what ways can professional level music software be used as an effective learning tool for creativity and composition in primary school aged children?” It further seeks to establish how its effectiveness can be optimised.

The project established a case study group of eight children aged between eight and twelve years old. Children were selected for their willingness to participate, parental support and their commitment to continue the study. Consideration was given to include children who would not be disadvantaged by missing regular classes and to those who might receive extra benefit from intensive small group work. Musical ability and computer proficiency were not considered.
Focusing Questions and Objectives

Through the case study, the project introduced the children to two programs, Cakewalk Pro Audio, and Cool Edit 2000. I am a competent user of each and have used them at a professional and personal level to compose, arrange and transcribe music, to record, and to compile CDs. Detailed description of the software can be found in Chapter 3. The children needed to become familiar with specific functions in each application to enable them to work successfully within each.

The study sought to use the programs in the creation of works that were composed, compiled and recorded by the children.

Why Professional Level Software?

Music software falls roughly into the following categories: drill and instruction; simple midi editors; midi sequencers; notation; audio recorders. This study looks specifically at an audio recorder; Cool Edit 2000, and a midi sequencer; Cakewalk Pro Audio 9.

Simple children’s music programs are available, but they focus on instruction, accompaniment and single line tunes. Two examples of such software are Songworks II and Kidmusic. Neither of these programs would have been appropriate to this study since they focus on music and music learning rather than just recording sound. Since this project was interested in creativity and composition, not on learning music, it was not appropriate to use software that was designed to follow strict compositional and musical guidelines.
The ideas of Papert, expressed at the start of this chapter, apply to all areas of educational computing. This study is based upon my belief, as well as Papert's, that children are capable of functioning and thriving in complex learning environments. I wanted to expose the children in this study to programs that would allow them to do anything they wanted. I did not want the participants limited by 'educational' or 'instructional' programs but able to explore and experiment in an unlimited musical software environment: a software environment that provided a full set of features that allows complete creative and compositional freedom. Thus, the use of professional level or high-end, advanced software rather than entry level, beginners' software was seen as essential.

Further discussion on the choice of software and the implications for its use can be found in Chapter 6.

Definitions

Professional Level Software

The study sought to establish ways in which professional level music software could be used as an effective learning tool for creativity and composition by primary school aged children. The qualification 'professional' is important to the focus of the research; for the purpose of the study it refers to software that contains sufficient features to allow its use by composers, engineers and musicians engaged in the production of music at a professional level or its equivalent. The software needs to provide an environment in which all aspects of midi and digital audio recording are available.
Both programs, Cakewalk and Cool Edit 2000, provide such an environment. Cool Edit 2000 is slightly restricted in that it offers only four-track recording, however it does offer all the other features of Cool Edit Pro, the full professional package produced by Syntrillium.

Cakewalk is a complete digital audio package. It would have been possible to undertake the study using only Cakewalk as it provides full midi and wave recording facilities as well as an extensive set of digital signal processing and editing tools. It was my belief that using Cakewalk for both purposes could have been confusing for the participants; I felt it better to introduce each program as either hard disk recording or midi sequencing.

It is possible to use either program to produce commercial CD and/or broadcast quality products. Thus each program falls clearly into the category ‘professional level’.

Creativity

The paper does not seek to define creativity nor does it wish to imply that the creative output of children can be judged as being ‘right or wrong’, ‘successful or unsuccessful’, or ‘good or bad’. Definition for the purpose of the study is however, required. Smith and Carlsson (1990 p. 5) refer to creativity as ‘a generative or perceptive way of experiencing reality, including the perceiver’s own self.’ This is a definition arrived at from a psychological perspective.

The study sought to establish professional level music software as an effective learning tool for creativity and composition. The intention here is not to describe a psychological attribute but a process of mind and action, which results in the creation
of a product that did not exist prior to that process. Thus, it may be appropriate to look at creativity in the same way in which Gardner (1999) looks at an intelligence:

'A biopsychological potential to process information that can be activated in a cultural setting to solve problems or create products that are of value in a culture.' (p. 33)

In this case, the 'biopsychological potential' is the creative process or the potential to create, the 'cultural setting' is the classroom and the expectation of reasonable age related outcomes, and the 'products of value' are the individual projects or tasks that were set for the participants.

Thus, creativity can be defined here as a process of mind and action which results in the creation of a product. Alternatively, using Gardner (1999): A potential to process information that can be activated to solve problems or create products that are of value.

**Composition**

For the purpose of this study, composition refers to the construction and organisation of sounds, either original or borrowed, into a musical whole. Adherence to established or accepted musical form is of no relevance. The emphasis is on the deliberate ordering of the participants' ideas into a product. Swanwick (1989, p.43) defines composition as; 'the act of making a musical object by assembling sound materials in an expressive way.' He is referring to 'all forms of musical invention, not merely works that are written down in any form of notation.'
Effective Learning Tool

For a tool to be effective it needs to be accessible, usable and affordable; it also needs to assist the user to accomplish or achieve an end. For it to be an effective learning tool it needs to be able to assist in the development of a skill, process or understanding. Ideally an effective learning tool should facilitate this development to a degree that would not ordinarily be achieved without that tool.

Limitations of the Study

Methods

The study had to be conducted within the framework of a minor thesis. No research grants were available and data collection, analysis and interpretation were the sole responsibility of the researcher.

Ideally, every session would have been recorded using multiple microphones placed around the room and mixed to separate tracks, to allow clear identification of participants and their interactions. The use of minidisc audio recordings of every session, in particular the final interviews, was of benefit to the analysis of data in context. The amount of background noise - this should have been anticipated given the nature of the project - and the availability of only single track recording has resulted in recordings of mixed quality and usability. Accordingly, transcription of recorded sessions proved difficult and, at times, ineffective and many interactions and conversations were indistinguishable.
Size and Composition of Sample Group

Given the restrictions of a minor thesis, the availability of appropriate equipment and the need for close supervision of participants, it was necessary to use only eight participants. Chapter 3 provides details of the sample size and reasons for choice.

Results of the study are found in Chapter 4. Part of the presentation of these results takes the form of stories of individual participants. Each story notes a high level of computing competence in the participants; this competence would be found across the whole school in which the study was located. It is important to emphasise that participants were not selected for their computing ability, nor for their musical ability.
CHAPTER 2

Literature

Introduction

It has proven difficult to locate literature that deals specifically with the issues raised in this paper: children composing and being creative in an advanced software environment. Understandably, much has been written about composition and about creativity, much has also been written about children’s composition and creativity. One can look to the work of Bamberger (1991) and Upitis (1990) for discussion on how children learn and perceive music, but this study does not focus on notational and rhythmic representations. Bamberger talks about the difference between knowing ‘how’ to do something and knowing ‘about’ something. She asks, “When you know about music, (does) the music itself change?” (p. 8) This study is concerned with ‘how’ to create with computers and knowing ‘about’ creativity.

I am interested in the purely expressive aspect of music, not how it is perceived or represented, nor in its structural integrity. The focus of this study is on the use of computers to promote creativity. It is less about children ‘learning’ music than about children working in a new environment and experiencing another medium for creativity.
This chapter investigates some thinking in the areas of creativity and composition, and the use of computers in those areas, and in education. It also looks at some historical viewpoints and tries to place them in a contemporary setting.

**Creativity and Composition**

Smith and Carlsson (1990) link creativity to risk taking. (p. 77) This view is supported by Amabile (1989) who states: ‘... creative people are able to take risks by occasionally doing something that might seem directly opposite to reaching the goal.’ (p. 175) The Smith and Carlsson work focuses on the identification of creativity and on the factors that contribute to its existence. Theirs is a scientific study of creative functioning; Amabile’s work concentrates more on the recognition of creativity and the factors that influence its development. Whilst not in a position to criticise or to make informed comment about Smith and Carlsson’s approach, my emphasis is not on the measurement or identification of creativity as a psychological or scientific phenomenon, but on creativity as a part of the compositional process.

Smith and Carlsson measure creativity using a Creative Functioning Test and a Meta-contrast Technique, in an attempt to quantify creative functioning and to predict its existence. This approach, although sharing a similar hypothesis about anxiety and creativity, is quite different to that taken by Amabile. The approach taken by Amabile (1983) is a ‘conceptual definition of creativity’ in a search to measure and assess creativity. She explains creativity in the following manner:
‘A product or response will be judged as creative to the extent that (a) it is both a novel and appropriate, useful, correct or valuable response to the task at hand, and (b) the task is heuristic rather than algorithmic.’ (p. 33)

She adds that ‘although it is necessary to articulate a conceptual definition, a satisfactory operational definition must return to the final criterion for creative assessment – reliable subjective judgement.’ (p. 35) This reliable subjective judgement is explored by Hickey (2001). Hickey’s results, which indicate that the best qualified experts to assess children’s compositions are general classroom music teachers, are used as a basis for my subjective assessment of the participants’ works. One problem for me as an assessor of other’s compositions, and to any listener, is expressed by Kratus (1994):

‘One of the difficulties we have in beginning to understand composition and improvisation is our own attitude regarding the uniqueness of each person’s creative work. By our definitions of creativity, every creative act is an expression of individuality.’ (p. 129)

Art, by its very nature, is based on individual perception, experience, interpretation and, of course, creation (Renk 1993) and (Jonassen 1999). The teaching of art and its assessment has to have a basis in experience and interpretation. McMillan (1993) believes that ‘arts teaching and creativity should be synonymous terms.’ (p.117) She sees composition and improvisation as integral parts of music education.

Swanwick (1988) is concerned with musical development and creativity; his theoretical basis is centred on the idea ‘that play, a vital human characteristic, is intrinsically bound up with all artistic activity.’ (p. 55) He talks of the sublimation of
childhood play activities into artistic activities. Does this imply that children's compositions are usually just an outcome of play? If that is the case, does that mean that the quality of those compositions is either creatively or artistically diminished? I doubt if those questions can be answered, certainly not here, and not by me. There is no hint of criticism of children's art in Swanwick's interpretation, just an attempt at understanding and explanation.

My study does not attempt to answer these questions, but looks for the creative and compositional integrity of the work produced. There is no comparison between the participants and artists, but an assessment of the process and the product in context.

Gardner (1982), in his attempts to understand creative and artistic development, looks for similarities and differences between 'child art' and 'art'. He also looks for an explanation of the apparent loss of creativity experienced by children after the age of five. Both Swanwick and Gardner are interested in experimentation and in mastery, and the way they shape musical and artistic achievement.

Since this study focuses on developing an environment in which creativity is encouraged, it is appropriate to look at how creativity may be destroyed. Amabile (1989) lists 'four methods for killing children's creativity' as:

Evaluation
Reward
Competition
Restricting Choice

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For her, these methods are not intrinsically counter-creative; it is their misuse and overuse, which tend to diminish the creative process. She summarises them as ‘coercion’. (p. 71) The question can now be asked. Do computers and advanced software encourage creativity? Again, this is a question to which there can be no definitive answer; except to say that on their own, they cannot. If, however, they can assist in providing the environment where the coercion is lessened, then opportunities for creativity are maximised. Within that context, it is again worth referring to Amabile:

‘It is not enough for us to train (children) in skills or give them opportunities in which to develop their talents. Nor is it enough to teach them good work habits. We must help them identify the places where their interests and their skills overlap: the Creativity Intersection.’ (1989 p. 63)

Computers

Computers promise the musician control over the entire sequence of composition, performance and presentation (Livermore 1993). Livermore sees the immediacy of feedback and the lack of need for other musicians as placing computers at the forefront of music making for the individual. The ‘liberating experience’ of using computers in music making (Alvarez 1989) describes the way a computer allows composers to question their material immediately and to perceive their work aurally. This changes the focus of composition from writing – as in notation and correct form – to building and hearing.

Weidenbach (1998) supports McMillan’s (1993) desire for composition in music education and believes that computers can ‘facilitate the creative act of composing.’ As
well as allowing students to manipulate and play with sound, computers allow access to a range of sounds ‘unlikely ever to be present in a classroom.’ The question she poses is ‘not “should computers be used in music?” but “how should they be used?”’ (p. 2)

Support for computer use in schools is not unanimous; the application of new technologies involves financial outlay as well as uncertainty about the long-term benefits of that technology. An argument that runs counter to much popular opinion is that computers are not an end in themselves, that the mere introduction of new technology does not present any educational alternatives or any new insights into teaching and learning. Armstrong and Casement (2001) argue that ‘the cost of a single computer could pay for a choral music program or a visual arts program for an entire school.’ (p. 196) Beyond their concern about cost, is the concern that there exist no data about the impact of computers on children and on learning. They add:

> When children learn to use a computer, they are not just learning a skill. They are changing the relation between themselves and the world around them. The way in which information is accessed, the manner of its presentation, and the ways in which it can be manipulated all alter children’s perceptions of knowing and doing. (p. 11)

Interesting analogies can be drawn between the use of word processors for writing and expressing ideas, and the use of music software for composing and expressing musical ideas. The view of Armstrong and Casement is that it is unrealistic to expect that students will become competent writers ‘simply by using a computer.’ They go on to say that, ‘no amount of technology can replace a teacher’s guidance.’ (p.103) In my study, I do not attempt to argue that the software causes the creative process, more that the software allows a level of composition to occur that would not ordinarily exist.
There is no suggestion that the participants could have operated without the guidance of a well qualified, well resourced teacher – in this case; myself.

Where Armstrong and Casement put forward arguments against the injudicious use of computers, Hutchby and Moran-Ellis (2001) are a little more circumspect. They attempt to ‘undermine … the simplistic notion that new technologies are going to radically reconfigure childhood (coupled as it usually is with a moral stance on this as either a very good or a very bad thing.)’ (p. 5)

The ideas of Walters et al. (1989) provide an historical perspective; their ideas need to be viewed accordingly. The development of computers and computer hardware and software since 1989 could not have been predicted. They said:

The computer can be used as an interim step in the compositional process, a place where the artist or composer experiments freely with ideas, changing them, discarding them. … the computer becomes a sketchpad. (Walters, Hodges and Simmons 1989 pp. 108, 109)

Their idea of a computer as only a sketchpad is obsolete. Of course, it can still serve that purpose, and does admirably, but it is now capable of producing a valid, quality finished work; not just a work that imitates art or traditional musical instruments, but also a work in its own right. Their concern was for the development of an appropriate curriculum in which to incorporate computers into arts education, my study serves as an example of how computers can be incorporated and one way in which that curriculum could be developed.
A similar historical perspective comes from Stevens (1985) in a discussion of the future of computers in music education. Stevens’ belief was that computers would fall into two areas, ‘instructional’ and ‘personal’, with the former being didactic, skills based applications reliant on drill and practice, the latter being applications that allow the student to compose through a computer. Stevens also highlights the need for research in this area. Later, he identified an important aspect of computerised music making as the ability of music software to lessen ‘the skill-intensive nature of the creative musical process for those who may not possess “the traditional musical skills” – the ability to play an instrument, to read musical notation and so on.’ (Stevens 1994 p. 59)

Davidson and Scripp (1989) have used computer support in their research into musical development. They conclude that computers can allow untrained children and adults to ‘engage in compositional tasks that suggest very strongly that musical development continues in spite of lack of training in musical notation, performance or ear training – let alone composition lessons.’ (p. 73)

**Conclusion**

This chapter has attempted to review some relevant literature and to place it within the context of this study. However, a ‘lack of consensus among researchers and educators about what musical development might be,’ (Davidson and Scripp 1989) does not make that task easy. Different ideas about creativity, its measurement and its existence in children’s art, add further confusion, as do the broader definitions of creativity that place it beyond the arts (Hargraeves 1989) and into science, mathematics and all walks of life. (Gardner 1982, 1999) There is not room, nor is it within the scope of this paper,
to investigate thoroughly, the topics of computers, creativity and composition, yet it is sufficient and appropriate to look at some of the issues.

It is apparent that much research has been undertaken within the field of children’s artistic and creative development; it is also clear that improvisation and composition are encouraged as a means to musical development. Where computers fit into this area, especially in the primary school, is not yet clear. It is hoped that this study will aid that knowledge or at least provide some small encouragement and point of reference to other researchers and educators.
CHAPTER 3

Methodology

Data Collection

Since it was not possible to predict which data would be of most value to the study, data was collected in a variety of ways. Minidisc recordings were made of every session and of follow up interviews, and the recordings were then transcribed. Only conversations and comments that were seen as relevant or potentially relevant to the study were used. The participants’ work files were saved to CD after each session, and every sound data file was later converted to audio format and burned to CD. Sixty-five complete compositions or works in progress were produced in this manner. These pieces form the bulk of useable data and the basis for analysis. Photographs were taken of participants at work and of the setting. Some video taping of sessions also occurred. Visual records were made to assist in the analysis and description of the physical environment, of the teaching/learning interactions and of the individual’s approach and response to his or her work.

A noisy work environment and limited recording facilities resulted in taped sessions in which many interactions and comments were lost. This was particularly the case in the last four sessions when the participants were involved in the production of their own projects.
A simple questionnaire to access prior knowledge, computer use and musical proficiency was given to each participant at the start of the project. Interviews with individual participants at the conclusion of the project provided insights into each participant's feelings about the project, their approach to the software and the set tasks, and their perceptions about their own creativity and compositional product.

Chapter 4 contains stories of individual participants. Each story presents the experience of one participant, reference to his or her music, a discussion of the child’s interaction with the software and, where appropriate, quotations from individual sessions. It was found that, in general, most useable data was taken from interpretation of the participant's work and from the final interview. Analysis of parent questionnaires and an overview of the group work and results also form part of Chapter 4.

The study sought to investigate the effectiveness or otherwise of professional level music software as a learning tool. Apart from collecting data about the interactions between the participants and the teacher, and the participants and the software, it was seen as essential that a product or products existed at the end of the study; analysis of these pieces can be found in Chapters 4 and 5. Throughout the study, small tasks were set; these tasks were used as a means of assessing appropriate use of the software and understanding of the functions within the software. They also provided developmental records of each participant's work in progress and his or her creative and compositional process.
Set up and Location

The study was undertaken in a small semi rural school east of Melbourne. The site selected is my place of employment. Familiarity with the participants, their parents and the school staff was seen as beneficial to the ease of data collection and to obtaining parental support in undertaking the project.

All classes were held in the school’s computer room – this is my own work place. The room is set up as a dedicated computer classroom. It contains 14 computers of varying ages – between one and five years old. Most computers are connected to the school’s network.

The setting itself was far from ideal and yet is probably representative of many primary school computer laboratories. The building is an old portable classroom that has been wired to accommodate the network, computers are located around the edge of the room, heating and cooling is through a single window-mounted air conditioner, and tables and chairs are of odd sizes. The room is a compromise between the desire to establish a dedicated computer room and extreme budget restrictions. The midi keyboards had to be located on tables next to the computers; restrictions were placed on their location by the length of midi cables. The room is not, nor was ever designed to be, a music and computer laboratory. This situation is of relevance to the results of the study and to any recommendations that arise from it; any implementation of computer based music programmes in primary schools may well depend on the ease of their implementation and the need or otherwise of establishing specific music/computer laboratories.
Equipment

Keyboards

The only requirements in the choice of midi keyboards were compatibility with General Midi and standard midi in and out connectors. The study sought to investigate the use of professional level music software, it did not seek to investigate the use of professional level keyboards or computer equipment. It is argued in Chapter 6 that the effectiveness or otherwise of the software may well be conditional upon whether or not schools can afford its use. If it is possible to use professional level software with domestic level equipment, the opportunities for its introduction into primary schools must be increased.

Four midi keyboards were used:

2 x Casio CTK-601 General Midi compatible, 61 keys, 200 tones, 100 rhythms. (Home use portable keyboard)

1 x Roland EM-10 General Midi compatible, 61 keys. (Home use portable keyboard)

1 x Yamaha W7 61 keys, 5 banks of 128 patches. Professional quality music synthesizer and sequencer. 16 Channel mixer, General Midi compatible.
Computers

Eight computers were used for the hard disk recording sessions and six for the midi and project sessions. Most of the computers were configured differently from each other and they varied in age. The school’s computer lab contains a variety of computers; I chose the following for the project:

- 3 x 133 mHz Pentiums (or equivalent) with 32 mb of RAM,
- 2 x 233 mHz Pentiums (or equivalent) with 64 mb of RAM,
- 2 x 533 mHz Compaqs with 64 mb of RAM
- 1 x HP 733 mHz with 256 mb of RAM.

These computers were chosen as the most suitable for the project based on their processor speed and the size of RAM; they were the biggest and fastest available at the school. With the exception of the HP 733, the size and speed of these computers is below that of most entry level domestic computers.

Each computer required an mpu 401 compatible sound card with full duplex capability. The mpu 401 is a universal standard for midi operation and full duplex allows a sound card to record and playback at the same time. This is standard for most modern sound cards and no additional sound cards were purchased. Midi breakout cables that plug into the joystick port on the sound card were required to connect the midi keyboards to the computer. I was able to borrow these and a keyboard from SoundHouse. (See Acknowledgements)
Each computer performed adequately during the study. The type of computers used in the study would be found in many school settings. No special equipment was purchased for the study.

**Headphones and Microphones**

I attempted to use cheap headphones for the study but found them to be inadequate and for the most part the participants worked without them. This resulted in sessions being noisy; the school did not have enough headphones that I could access. Many schools have listening post set-ups in classrooms; these would prove adequate, provided input adapters were available.

The school owned four computer microphones; these microphones were approximately $15.00 each and of low quality. They were of adequate quality for the purposes of the study. Microphones of superior quality will produce a superior quality recorded signal, but are probably not necessary, given rough classroom handling and the noisy environment in which they are used.

**Selection Criteria**

I chose to preselect participants, rather than select them randomly. One reason for this choice was to ensure full participation by the subject for the study. The study was undertaken during normal school hours and thus required participants to miss about one hour of normal class time each week for ten weeks. Random selection of participants may have resulted in the selection of children who would be adversely affected by missing such an amount of class time.
Selection was made in consultation with both the school principal and the relevant classroom teachers. It was made in a way that sought to find children who would not be disadvantaged by missing regular class time, or children who would particularly benefit from specialised small group work. The other teachers and I believed that many would see inclusion in the study as a reward; accordingly we tried to select children who had been making a positive contribution to their class. I tried to include children who had shown a particular interest in assisting me in the computer room. In choosing participants, no consideration was given to their musical ability or to their computer skills.

Parents of preselected participants were invited to show an expression of interest in the study; all of those selected chose to accept. Detailed descriptions of each participant and their interactions with the software are presented in Chapter 4.

Sample Size and Makeup

The study set out to establish an environment in which professional level software could be used as an effective learning tool. I felt that a small sample was necessary for the following reasons:

- available number of computers with the capacity to handle the software and processing demands
- limited number of midi keyboards
- staff student ratio needed to be small enough to enable adequate time with each participant
• time restrictions on analysis of tapes and other data.

Given the above limitations and the need to provide a cross-sectional sample (Greig and Taylor, 1999), which would have relevance to a broad range of primary school classes, I chose to work with Grades 3 – 6. It seemed appropriate and equitable to include both girls and boys so I decided to use one girl and one boy from each year level. Mayall (2000) and O’Kane (2000) stress the importance of doing research ‘with’ children, rather than ‘on’ them. The small size of the group meant that I had a real opportunity to work closely with each student.

**Presentation of Lessons**

The study was undertaken in a manner that attempted to reproduce a normal primary school class activity. This was not entirely possible due to the small size of the group. Sessions 1 to 7 inclusive, were accompanied by html or web-based onscreen lesson notes (see Appendix 1). It was my intention that these notes would become reference or help files for the participants, which would enable the children to work with very little help from me. This proved not to be the case. The lesson files did prove to be valuable to me as planning tools and replaced traditional teacher’s lesson plans, but the children preferred to use me as their point of reference.

Each session was presented with a specific skills focus; frequently an exercise was set to develop that skill. Where possible as much free exploration time as possible was given. The final four sessions were devoted to development and completion of a set project task. An overview of lesson structure is as follows:
Lesson 1

Welcome and introduction to Cool Edit 2000
Explanation of the two views – Waveform and Multitrack
Discussion on the different types of wave files
Experimentation with wave sounds
Importing of files
Loop duplicating
Saving
Basic operational skills

Lesson 2

Revision from week 1 – manipulating waves, use of mouse buttons, loop duplicate
Saving and organising files – new folders, session folders
Recording – use of the volume control properties window, arming tracks, use of the transport

Lesson 3

Production of a voice-over
Choosing content
Adding effects to waves
Track alignment
Deleting waves or sections of waves

Lesson 4

Revision Exercises through the production of a simple, mixed-down piece
Saving
Recording
Editing waves – effects
Loop duplicating
Mixing down

Lesson 5

Introduction to Cakewalk Pro Audio 9
Discovery of similarities to other programs
Overview of available windows
Experimentation with midi sounds
Saving
Cutting, pasting and transposition
Free play

Lesson 6

Composition using Cakewalk
Creating a new file with a template
Choosing sounds (patches)
Using drums
Using the metronome
Setting and changing tempo
Recording midi data

Lesson 7

Establishment of project requirements
Cakewalk revision
Finding and inserting drum tracks
Saving midi files
Mixing midi files using the console
Recording the synthesizer into Cool Edit
Using both programs together

No lesson files were required for lessons 8 to 10 as these sessions were devoted to the production of the final project.
The Software

Explanation of Terms

Controllers
Pedals, knobs, and wheels on an electronic instrument that can be used to change the sound.

A computer can work the controllers on electronic instruments by sending midi Controller messages.

The midi specification allows for 128 different types of controllers. Every controller can take on a value ranging from 0 to 12

Digital Audio
The process of converting sound into digital information for storage and editing. In the past, sound has been recorded to magnetic tape.

Digital audio can be hard disk recording or other digital formats such as DAT, Minidisc or CD

Four-track recording
Multitrack recording that is limited to a maximum of four tracks.

General Midi
A universal standard set of 128 midi patches.
<table>
<thead>
<tr>
<th><strong>Hard Disk</strong></th>
<th>The process of recording audio data (sound) straight onto a computer’s hard disk drive.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Midi</strong></td>
<td>Musical Instrument Digital Interface – A protocol that allows a synthesizer or other tone generator to interact with a computer. Midi data is not recorded sound, rather it is a set of instructions, or events, that are stored in a computer and replayed on a midi device.</td>
</tr>
<tr>
<td><strong>Midi Channel</strong></td>
<td>A corridor of information specific to corresponding input/output sources on a computer and a midi instrument. The corridor that a computer and a midi instrument use to communicate information about an individual sound or series of events.</td>
</tr>
<tr>
<td><strong>Mix Down</strong></td>
<td>Combine two or more tracks or parts of tracks to produce a single wave. A final edit of a multitrack piece that has been balanced, adjusted and reduced to a single (usually) stereo wave.</td>
</tr>
<tr>
<td><strong>Multitrack Recording</strong></td>
<td>The process of layering multiple tracks of different sounds to produce a finished piece.</td>
</tr>
</tbody>
</table>
Recording different components of a piece onto separate tracks to allow editing and balancing before the piece is completed.

**Pan**

The side (left or right) to which an audio signal is directed. Sounds or tracks can be set to sound as if they are coming from a position other than the middle.

**Patch**

A specific midi sound.

The name comes from the days when synthesizers were programmed by “patching” tone generators and filters together with leads.

**Session**

A Multitrack project in Cool Edit. Session files do not actually store wave files, rather they store a location for them.

A session will hold the details of a project including information regarding volume, pan settings and duplications.

**Track**

A place for putting individual recordings of midi or wave data that will make up a whole piece.

In Cakewalk, it is where audio or midi data are positioned and arranged in a project.
In Cool Edit, it is where audio data are positioned and arranged in a session.

**Wave**

A wave file is any audio file format that contains wave data such as .wav, mp3 or .au.

A waveform is the visual representation of that data, or, in an acoustical sense, the signal itself.

**Introduction**

Music software generally falls into two categories: midi sequencers and hard disk, or digital audio recorders. Recently the most advanced midi sequencers have incorporated digital audio recording capabilities. Most computers come with simple wave recorders and players: Windows sound recorder and Windows media player. Many of these programs can also play midi files and some will allow midi recording. Some multimedia type programs: MicroWorlds and PowerPoint, also allow for the recording of midi and wave files. None of these programs allow for anything more than the simplest editing; cutting, copying and pasting.

Programs of the calibre of Cool Edit and Cakewalk, allow for full multitrack editing and recording, as well as complex editing of individual sounds.
Cool Edit 2000

Cool Edit 2000 is a four-track hard disk recording program. It operates in two different views: the Wave File View and the Multitrack View. It is a cheaper version of Cool Edit Pro, the top of the range digital multitrack recording program produced by Syntrillium. Its features are almost identical to Cool Edit Pro except that it is limited to four tracks per session, is only available for purchase online and can be purchased as a series of plug-ins: the Wave File View being the basis upon which to add Multitrack View and as many effects as desired. The copy used in this project contained the full feature set.

The Wave File View (Figure 3.1) displays an individual wave file. It allows the operator to edit the wave. Editing includes changing its volume (amplitude), adding effects such as delay, reverb and echo, changing the pitch and speed, and adding filters such as parametric and graphic equalization and compression, expansion and gating. In the Wave file view it is also possible to add silence, cut and paste and delete sections of the wave, as well as record new waves.
The Multitrack View (Figure 3.2) displays all the tracks that are in a particular session. A session is the name given to a piece that requires more than one track. In the Multitrack View it is possible to insert and delete waves, to move them around within the piece, loop duplicate them and set volume and pan (left or right) envelopes. The Multitrack View allows the operator to see and hear the whole piece, to record new waves into it and to mix it down.
The Interface

Cool Edit contains a set of menu items and corresponding icon buttons. Most functions can be accessed with a left or right click on a wave or other part of the window. Universal menu names such as File, Edit, Insert, View, Options and Help in the Multitrack View make it familiar to users who have basic windows experience. The Wave File View contains a greater array of menu items.

Individual tracks can be muted, soloed or recorded by clicking on each track's control buttons. Volume and pan settings for the whole track can be set in the same way. Realtime changes in volume and pan can be drawn onto the track.
As there are more functions available in The Wave File View than in the Multitrack View there are more menu items and more buttons. This makes The Wave File View less familiar to users.

Recording is accomplished by selecting the desired track and format, and clicking the ‘record’ button. The user needs to differentiate between microphone recordings and line recordings. It was necessary in this study, to select the input source in Windows Recording Properties, before recording.

Individual waves need to be saved as they are created. Waves can be saved in a variety of formats, this study used .wav (Windows PCM). It is advisable to save waves into a Session folder.

**Cakewalk Pro Audio 9.03**

Cakewalk is the latest and last version of what started as a midi-sequencing program. It has recently been replaced by Sonar. The midi functions of Cakewalk were the ones used in this project. However, Cakewalk is also a complete audio recording tool. I chose not to use this function in this project to avoid possible confusion about the two formats within the same program.

Cakewalk can record up to 256 separate tracks of midi and audio data, or 128 tracks of audio data only. It operates up to 16 separate midi channels but can incorporate several sound cards to enable additional midi channels from different sources.
The track view (Figure 3.3) is the main operating window and it displays all the details of all the tracks in use and graphical representations of midi data and wave data. Each track has five other views in which individual track editing can occur:

- Staff view (Figure 3.4) displays traditional notation
- Piano roll view (Figure 3.5) displays graphical midi data related to a piano keyboard and controller windows
- Events list view displays descriptions of all midi events,
- Audio view displays graphical audio data
- Lyrics view displays song words.

![Figure 3.3 The Track View – Cakewalk](image)
Figure 3.4 The Staff View – Cakewalk

Figure 3.5 The Piano Roll View – Cakewalk
In addition, all tracks can be viewed through the console (Figure 3.6) (virtual mixing desk). All of the above views can be used to view multiple tracks.

![Figure 3.6 The Console View – Cakewalk](image)

Files are saved in a variety of forms. Cakewalk projects are saved as .wrk files; these files contain all the midi data and representations of wave data. Midi data can be saved in four different midi formats and waves can be imported as .wav files as well as mp3 and other wave formats.

It is necessary to establish instrument definitions to enable Cakewalk to communicate with a specific synthesizer or module. This project only dealt with General Midi, which is the default instrument definition in Cakewalk.
The Interface

Cakewalk uses standard menu items such as File, Edit, View and Insert. Other specific menus refer to specific features of the program. Corresponding buttons exist for each menu item.

![Cakewalk Menu Bar and Buttons](image)

Figure 3.7 The Cakewalk Menu Bar and Buttons

The main Track View (Figure 3.3) window contains details of all track information in a grid format. Names of instrument, patch and channel as well as controller settings are displayed on one section of the grid. Midi or audio data are displayed in a graphical representation on the other section of the grid. The data section is divided into bars or measures. The other views windows are accessed from the track view or the menu bar. Each window contains its own set of operation buttons. Multiple windows can be opened at the same time in any combination but the Track View window must always remain open.

If using an external midi device, as was the case in this study, it is necessary to connect that device to the computer through the sound card. Once this has been accomplished and Cakewalk recognises the synthesizer – this study only used General Midi, so recognition was automatic – it is possible to begin recording.
Individual tracks in Cakewalk need to be ‘armed’ before they will accept data. When armed, an input source needs to be selected, this is achieved by choosing a source in the Track View. It is then possible to commence recording. Depending on the input source – audio or midi – Cakewalk will automatically recognise the data format.

Cakewalk automatically save its files into a project. This results in all associated data being keep together.
CHAPTER 4

Results

Individual Stories

The following seven stories document each child’s experience, their problems and outcomes. The majority of information presented comes from analysis of each child’s work files and from interviews conducted at the conclusion of the study. A large amount of this dissertation is devoted to these stories as they present each child’s perspective in a manner that is not achievable through observation of sessions.

Dane’s Story

Dane is in Grade 6. Dane missed the first two sessions and the last one. The time he missed didn’t seem to make any difference to his ability to use the software.

Dane spends a lot of time on the computer at home although his computer has been moved out of his room. He usually does his homework on it using Publisher and he just plays games. (I 2.44) He has not had any formal music lessons but says that he is going to learn the drums at high school next year.

1 This chapter, in particular, makes reference to transcripts of interviews and lessons. The referencing procedure is as follows: I 2.44 refers to minidisc number I 2, track number 44
He sees himself as a competent computer user; he is comfortable with Word, PowerPoint and Publisher and has worked well on creating a web page with FrontPage. He uses MicroWorlds but is most comfortable animating turtles rather than writing procedures.

**Cool Edit**

As Dane missed the first two sessions Natalie volunteered to help him. This worked well for a little while with Natalie explaining how things worked and guiding him through the process. (S 3.11 – 21) Dane then felt that he needed to take a bigger role in the process and was not completely happy with what Natalie was doing. It became necessary to separate them and I needed to give Dane a different approach.

After separating Natalie and Dane I showed Dane the Cool Edit sample session. It is a short promotional piece for Cool Edit. It contains five tracks (two are situated on the same track) and has a voice-over, drums, synthesizer, guitar and a background of crickets chirping. This cricket sound later became a feature in a couple of pieces.

I had deliberately not used this example with the other participants to avoid it influencing their approach to the software. Given Dane’s lack of attendance I saw this as a reasonable shortcut for him. His first attempt was to move the files around and record a new voice over. Unfortunately he only saved the mixdown, not the component files. But even in this he positioned files correctly and balanced voice and background.
For his second attempt (Crickets3 – Track 1(T1))² he again removed the voice-over and added his own and moved some of the files around. This time he played around with the volume and pan envelopes and created a little story about the crickets keeping him awake at night. He had no difficulty with the program and demonstrated this by producing a mix of his first piece and completing his required work in session 3.

Session 4 saw Dane working with Tom. This was not an entirely satisfactory arrangement either, with considerable off task behaviour occurring. They did manage to produce two interesting attempts at radio DJs (Fox4 – T3 and Voices4 – T7) but didn’t keep the unmixed tracks of one (Fox4) and failed to mix the other (Voices4).

**Cakewalk**

Dane seemed very keen to explore the sounds, especially the effects sounds, on his synthesizer. He appeared to have a reasonable understanding of how to use the software but did not demonstrate any desire to produce a piece of music using it. His and Tom’s Bach piece (Bach Cakewalk Dane Tom – T2) was interesting as they slowed down the tempo in the last few bars. They also introduced a new sound at that point. After a lot of badgering, they produced their black note piece in Session 6 but as with the others were not impressed by the guidelines I had set.

An interesting, and perhaps disappointing, outcome of Session 6 was that Dane and Tom had worked on a piece that used a pentatonic scale in contrary motion using piano and a woodblock. The piece was not saved through a misunderstanding on my behalf (I thought the boys were only being silly) and it only exists on the taped transcript of that

² Refers to the name and/or track number contained on CD – Attachment 1 – See Appendix 3
session. (S 6. 34 - 40) It is of interest to note that the two boys, after considerable
disagreement and mucking around, actually worked well together and demonstrated
good understanding of the software and the compositional and recording process.

Dane preferred using Cool Edit to Cakewalk, his reason was that Cool Edit was more
straightforward (I 2.49) and that he ‘just picked one and Cool Edit seemed easier’ (I
2.49) He thought that both programs did the same thing. He said, ‘They seemed to me
like different programs, same use but different way to use it.’ (I 2.50) I had explained
this difference (S 4.1, S 5.5) but had not taken the opportunity to see if the participants
had understood.

**Project – The Lost Boy**

For Session 7 and half of Session 8 Dane and Tom worked on a story about a little lost
boy. Very much like Melissa and Jessica, this story was a narrative with incidental
music. I separated Dane and Tom in Session 8 and Dane worked on his own,
sometimes enlisting the help of Natalie – although that partnership was not successful
either.

The lost boy story progressed well but remained unfinished as Dane was away for the
final session. It is quite linear in structure with very little use of multi tracking. I think
that Dane found it difficult to work with the overwhelming number of choices of
sounds and options available to him within the two programs. His desire to explore and
to play with them was greater than his desire to create a piece. He has managed,
however, to create the first part of an interesting narrative with sounds. If I had
managed to focus his attention more clearly on the creative, and on a topic that was of interest to him, he might have managed to be more productive.

**Conclusion**

Dane was well able to use both software applications. He had no trouble recording, deleting, inserting and mixing down files, or in adding effects. In Cakewalk he managed to find and alter patches as well as record midi data and change pitch and tempo. I believe that the hardest part of this project for Dane was operating creatively in an environment that was noisy and often distracting.

**David’s Story**

David is in Grade 4. He is extremely quiet and is reluctant, both in class and in the playground, to carry out conversations with staff and other children, except for his small group of friends. He prefers to work on his own, but if required to work with a partner will find it difficult unless it is with one of his friends.

He is a competent computer user at school and spends a lot of time on the computer at home. He is comfortable with PowerPoint, MicroWorlds and Word, and can use Paint Shop Pro and FrontPage. At home he plays games; Simms and Macro 2, and likes to do PowerPoint presentations. He has had no formal music lessons and even though he learns recorder at school he keeps ‘forgetting to bring it’ (I 1.54) on purpose.
He had never used Cakewalk or Cool Edit.

**Cool Edit**

David seemed very comfortable using Cool Edit. He understood how to save his files, and of all the participants he had the least difficulty in organising and saving his work. He found it difficult remembering where the sounds were and was not comfortable using the microphone to record his own voice.

Below is a transcript from Session 2 (S 2). David had been sitting not doing anything, I am trying to get him to use the microphone.

(D = David, R = Nick Reynolds (the author) N = Natalie. Disc S 2)

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>59</td>
<td>[D]</td>
<td>(David is unresponsive at this stage. R is asking him to use the microphone - he is not replying)</td>
</tr>
<tr>
<td>59</td>
<td>R TO D</td>
<td>[Still to David] Record something</td>
</tr>
<tr>
<td>59</td>
<td>D</td>
<td>(silence)</td>
</tr>
<tr>
<td>59</td>
<td>R</td>
<td>What are you going to say ‘My name is David’</td>
</tr>
<tr>
<td>59</td>
<td>D</td>
<td>(silence)</td>
</tr>
<tr>
<td>59</td>
<td>R</td>
<td>‘ha ha ha ha’ do that</td>
</tr>
<tr>
<td>59</td>
<td>D</td>
<td>[silence]</td>
</tr>
<tr>
<td>59</td>
<td>R</td>
<td>[10 secs wait] What about ‘hello’ You don’t want to do that? You don’t want to record yourself?</td>
</tr>
<tr>
<td>59</td>
<td>D</td>
<td>No</td>
</tr>
<tr>
<td>59</td>
<td>R</td>
<td>Would you like to record me?</td>
</tr>
<tr>
<td>59</td>
<td>D</td>
<td>No</td>
</tr>
<tr>
<td>59</td>
<td>R</td>
<td>What about the kids?</td>
</tr>
<tr>
<td>----</td>
<td>---</td>
<td>----------------------</td>
</tr>
<tr>
<td>59</td>
<td>D</td>
<td>No I don’t want to do that</td>
</tr>
<tr>
<td>59</td>
<td>R</td>
<td>You don’t want to do it? You don’t want to record anyone?</td>
</tr>
<tr>
<td>59</td>
<td>D</td>
<td>No</td>
</tr>
<tr>
<td>59</td>
<td>R</td>
<td>Ok what do you want to record?</td>
</tr>
<tr>
<td>59</td>
<td>D</td>
<td>Nothing</td>
</tr>
<tr>
<td>59</td>
<td>R</td>
<td>Nothing? You were happy just bringing in sounds were you?</td>
</tr>
<tr>
<td>59</td>
<td>D</td>
<td>Yes</td>
</tr>
<tr>
<td>59</td>
<td>R</td>
<td>Ok fine. You don’t have to do any recording. And as we get on you might find that … somewhere else that you want to use.</td>
</tr>
<tr>
<td>60</td>
<td>R</td>
<td>Can I just record something for you?</td>
</tr>
<tr>
<td>60</td>
<td>N</td>
<td>Mr Reynolds what exactly are we supposed to be recording?</td>
</tr>
<tr>
<td>60</td>
<td>[R]</td>
<td>[Has just recorded Jessica and Melissa as they work. This is in David’s session (see ‘David 2 nick mix.wav’)]</td>
</tr>
</tbody>
</table>

In the end the microphone was left recording and sounds of Jessica and Melissa working were recorded and put into David’s piece. When asked about not wanting to record himself, David said that he couldn’t hear himself or he ‘didn’t have much to say.’ (I 1.56) He also thought that it would have been better if he could have used his headset microphone from home, but his mum wouldn’t let him bring it.

Although he was not sure about the meanings of mixdown and four-track recording, when prompted he remembered what they were and expressed confidence in his ability to carry out those tasks and to teach others the same.
Cakewalk

David was the only participant to really follow my instructions regarding using the black notes on the keyboard for Session 7. He managed to create a midi piece comprising four different tracks with bass, melody, drums and second melody. I don’t think that he was terribly pleased with the result of his efforts but he was pleased that he had completed the set task. As with Cool Edit, David had no trouble saving and locating his saved files. He was confident that he had a good understanding of Cakewalk, his only criticism was that ‘it has too many musical sounds that you can choose from.’ (I 1.60)

He said that he preferred Cakewalk to Cool Edit and would be comfortable teaching either program.

Project - Train Journey

David had trouble expanding his project from his original idea. His first project session was not productive. He managed only to find some drums, these later became the basis for his ‘Train’ piece. (Train Journey – T8) When he started to incorporate his work into Cool Edit (Session 8) he worked very slowly. He recorded his voice making only sounds. The sounds are representative of a train station with garbled p.a. messages and the noise of a train. These sounds were layered over the drum track. The next week he split up the drums, cut some of the voice effects and added a character voice, he appears to be saying ‘come on deedee a train is coming’.
For the last session he threw out all of his voice work and started again with a piece about a train attack. He used the same drum track and again split it up to use in between his voice-over. He managed to create some impressive bomb and gun sounds using only his voice and some transformation effects in Cool Edit, he found a gunshot patch on his keyboard and incorporated that. He did not play any music but interestingly, he sang a little dramatic interlude.

**Conclusion**

It was a little difficult monitoring David’s progress during the sessions as he says so little. Each time I checked with him he was working well, except for once when he was playing his digimon. He understood all of the basic concepts of both programs and saved all his files correctly. The other children did not respond well to his work but they were impressed by his creation of gun and bomb sounds and by his use of drums.

David was pleased to be part of the project and has expressed satisfaction with his own work.

**Jed’s Story**

Jed is in Grade 3. He is regarded as hardworking and studious by his teachers and I have found him to be an independent worker. He does not allow himself to be easily distracted and he tends to be positive and well behaved in class. His mother showed some surprise at his selection into the project, as she does not see him as particularly
musical. Apart from classroom recorder lessons at school, Jed has had no formal music instruction. He had never seen or heard of Cakewalk or Cool Edit prior to this project.

He stated that he spends one to two hours per day on the computer, although his mother felt that to be an exaggeration. When using his home computer he likes to ‘write stuff and play games’ (I 1.1)

At school, Jed is a competent user of PowerPoint, Word and MicroWorlds, and has had some success with FrontPage, HyperStudio and Paint Shop Pro.

**Cool Edit**

His approach to the set tasks in this project was similar to my observations of him in class. He asks questions, decides on a course of action and proceeds. His enthusiasm was apparent from the start.

Cool Edit gave Jed very little trouble. As with other children, his understanding of the application appeared intuitive. Jed’s problem was with duplicating files and saving them as individual files instead of duplicates of files. This occurred in Sessions 1, 3 and 4 which indicates that he did not achieve understanding of this function in the program. This is not critical to its effective use. It just uses a lot more disk space.

Although Jed said that he didn’t know what the pan and volume envelopes were (I 1.6) he used them appropriately in Sessions 1, 2 and in particular Session 3. (Jed3 – T21). Saving files was a problem for Jed, and others. He both forgot to save them, and then didn’t know what to do with them when he closed the session, or he saved them to the
wrong folder. It was possible for me to rebuild the sessions by locating the waves and re-saving them in the correct folder.

Jed enjoyed mixing rhythms. He often used contrasting rhythmic patterns in the same piece. When asked about this (I 1.10) he could not offer any reason as to why. He seemed to just like making the sounds. This use of cross-rhythm is particularly apparent in Jed3 (T21) and Jed AD7 (T18).

Cakewalk

Jed said that he found Cakewalk harder to use than Cool Edit. His reason for this was that ‘It was hard to find music’ (I 1.10). He managed to find and alter patches and to record midi data and wave data using the synthesizer. He enjoyed being given drum and rhythm tracks to work with and used them as the basis of his work.

Conclusion

He stated that he enjoyed the project (I 1.12) and that he had ‘learned lots about sounds and how to mix music and how it sounds’. (I 1.13) He is confident that he could teach someone else how to use the programs and can see a use for Cool Edit in the classroom.

Jed’s use of the programs, particularly Cool Edit, shows an understanding of their basic workings. He has used Cool Edit to a level that allows him to record, transform and play back waves in a four-track environment and to mixdown those waves. He has created pieces which show a desire to experiment with music and voice in an original
manner. Although these pieces may test the listener’s preconceptions about rhythmic and tonal niceties, each of them has been carefully and thoughtfully constructed.

Melissa and Jessica’s Story

I have put Melissa and Jessica together as that is how they worked. Apart from the very first session, all of their work has been together. Even in the first session they spent time together solving problems and helping each other. When the opportunity to work together arose, they took it eagerly.

Melissa

Melissa is in Grade 4. She has never had formal music lessons except for two years of recorder (which she enjoys) at school. There are no musical instruments in her home and although she has a computer it ‘gets packed away’ (I 1.36).

Melissa is a hard working student who rarely attracts attention to herself. She is competent with PowerPoint, Word and MicroWorlds and has used FrontPage and Paint Shop Pro. She was not familiar with Cakewalk or Cool Edit. She enjoyed the project and would like to do more. In particular, she liked recording, especially her own voice. ‘That’s the part I loved,’ she said, ‘It was just fun listening to your voices, all giggling and stuff’. (I 1.38)
Melissa preferred Cool Edit to Cakewalk because ‘you could record … I understood (sic) it more’ and she ‘could do the buttons more’ (I 1.43).

Jessica

Jessica is in Grade 3. Last year she was at another school and has not used PowerPoint, nor had she used MicroWorlds until this year. She is currently trying to make a web page using FrontPage. Jessica is the only student in the study who has received formal music training. She has been learning the piano for about two years. She does not have a piano at home but uses a keyboard.

Her family own a laptop and a desktop computer and she uses them mostly to play The Simms. She had not used Cakewalk or Cool Edit before this project. She is a keen computer user at school and loves using MicroWorlds.

Jessica is a keen student who constantly asks questions. She appears to need to establish clearly in her mind what is required in a task and how to approach it. Observations of her in class indicate that she is an extremely competent student but one who is reluctant to learn through trial and error.

Cool Edit

Apart from the first session and the Cakewalk skills sessions, the girls worked together on story type pieces. Melissa’s first piece is short and simple but demonstrates her ability to save correctly, to loop duplicate and to combine tracks. She produced another
track on her own during Session three when Jessica was late. This track (Mel’s Music – T33) shows panning and splitting of waves but incomplete saving.

Jessica’s first piece is only about 2 seconds long and was not saved properly. She said it ‘was terrible. I didn’t think it sounded right so I kept deleting things. And in the end it got smaller and smaller’. (I 1.39,40)

The problem of saving occurred again in the second session (Dog Biscuits – T32) when files were saved to the wrong folder, or were incorrectly named, or not named at the time of recording. Session 3 saw the girls continuing with ‘Dog Biscuits’. They resaved it, deleted some music files and added more voices. These operations alone indicate a developing understanding of Cool Edit and how it can be used to suit their purpose.

Session 4 saw the same problem of saving to the wrong folder or not saving in the session, however, the piece they produced used a competent blend of voice and music as well as appropriate use of effects application to the papa chipmunk voice. This piece was very popular with the other participants especially for the use of voice effects.

**Cakewalk**

The girls found Cakewalk to be harder to use than Cool Edit. Melissa indicated that she ‘only knows a couple of songs, about six’ on the piano (I 1.44). This seemed to be of concern to her as she felt she needed to know how to play to use the program. Jessica managed to record a piece she had learned, as did Melissa. I tried to insist that they did not use those pieces but it seemed important to them. They showed great
reluctance to use the black notes only, which was my requirement of them. All participants except David refused to use black notes only.

They enjoyed Cakewalk when they started to discover sounds, in particular drums, but still struggled with the whole concept of writing their own notes. It would be safe to say that they showed signs of beginning competence with the program.

**Project – The Dragon and The Unicorn**

For the final four weeks, Jessica and Melissa worked on their ‘Dragon’ piece. A story about a dragon and a unicorn, it unfolded slowly and with very little written script. Each week they resaved their files and created a new folder and session (Dragon7, 8, 9, mix – T28,29,30,31). Altogether, they only incorrectly saved one file out of nineteen, this indicates a developed understanding of Cool Edit’s file saving operations.

‘Dragon’ is linear in style with a storyline and incidental music. The music serves to highlight the dramatic intention of the words. Unfortunately the piece remains unfinished but the girls have indicated a willingness to complete it in their own time. At one minute and 50 seconds this is the longest piece produced in the project. I believe that the collaboration between these two girls was very successful. They have both expressed confidence in their ability to teach others what they have learned and have thoroughly enjoyed participating in the project.
Natalie’s Story

Natalie is in Grade 6. There is some confusion as to whether or not she has a computer at home. She had indicated initially that there was no computer at home; in her final interview, she said that they had a laptop. It seems that the laptop ‘hasn’t got much on it’ (I 2.18) and apart from Solitaire is only used for typing. When asked what she types she replied, ‘... just anything. Names, anything’ (I 2.18).

At school she uses ‘heaps of programs’ (I 2.19) and considers herself good at Word, MicroWorlds, PowerPoint, Ixla Photo Easy and Paint Shop Pro. She is not really a computer games player, preferring to spend time working with photographs and multimedia.

Natalie has not received formal music lessons except for school recorder. She does not have any musical instruments at home.

Natalie’s work throughout the project can only be described as hot and cold. She started enthusiastically, produced a very good first piece and then nothing for week 2. Session 3 saw her being distracted by Dane and unable to complete anything until very late in the session when she combined two separate drum tracks. This in itself may not seem to be much, but she managed to overlay them so they fitted with each other (Natalie3 – T38). In Session 4, she worked with Dane for some of the session and then on her own, she again had difficulty settling and only managed to add a short voice over to her ‘crickets’ track.
Session 5, and the introduction of Cakewalk and Natalie, working with Tessa, was almost back on track. Session 6 was not much better but she was doing all the required work. At the start of the set project she became very enthusiastic and started composing. By the end of the set project she had produced a remarkably complex and complete piece.

**The Programs**

Natalie had little trouble using either program. She used each program appropriately, was able to utilise the required components and managed to save nearly all her files correctly. With Cool Edit she liked the idea of being able to ‘play around with all different sounds’ and if you didn’t like them being able to change them (I 2.24). She had a good understanding of mixing down and demonstrated an organised approach to using the program.

Natalie was one of only two participants (the other was David) who preferred Cakewalk to Cool Edit she said:

> I think I liked it better, it was better because you could see the whole thing, and you could get more sounds, all at the same time and have like all different sounds playing at the same time. Without having to just do four at a time without having to mix down and everything. (I 2.26)

She liked ‘having all the sounds’ and the ability to ‘have other sounds being louder than other ones.’ (I 2.27)
When I showed Natalie Cakewalk's ability to record waves as well as midi she understood immediately what I meant and demonstrated her knowledge by pointing out the difference on an example.

**The Composition**

Despite what I have described above as Natalie's hot and cold approach, she produced a remarkable piece. (Tinkerbell – T35) Her work with Cool Edit was interesting and she used the program to later record her composition, but mostly she worked in Cakewalk.

When asked where she might use the programs she reluctantly confessed to wanting to be a singer and that her sister and her make up songs and practise them and sing them. (I 2.30) It was this that gave her the focus for her piece. She wanted to create a band using Cakewalk. This was in her mind all along; she just needed to find the right basis for the music. Cakewalk exposed her to a great range of drum tracks that she could use.

Initially she tried to make her own drums but found that very hard, she said:

... I couldn't get the right sound and um how to do the big drum rolls and everything. It was just harder doing it on the keyboard because you couldn't find the right sounds. (I 2.32)

When she found the right sound the rest fell into place.
I was very interested in her compositional process during her final interview I asked her about it.

(N = Natalie, R = Nick Reynolds (the author) Disc I 2)

<table>
<thead>
<tr>
<th>R</th>
<th>So you got this drum sound and you liked it</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>Yes</td>
</tr>
<tr>
<td>R</td>
<td>(plays Nat project 1) And then what did you do?</td>
</tr>
<tr>
<td>N</td>
<td>Well I played it and I thought in my head a good beat that would go with it, and this is it.</td>
</tr>
<tr>
<td>R</td>
<td>You thought that in your head?</td>
</tr>
<tr>
<td>N</td>
<td>I thought that in my head</td>
</tr>
<tr>
<td>R</td>
<td>Can you tell me what you thought in your head?</td>
</tr>
<tr>
<td>N</td>
<td>Well I thought, first I thought of a sound. I played around with the keyboard and picked out a really nice sound that went with the music. And then played other sounds with it. And then picked out all different keys and then thought in my head a tune, like a tune to go with the music</td>
</tr>
<tr>
<td>33</td>
<td>And</td>
</tr>
<tr>
<td>R</td>
<td>So you did that (sings) dah dum</td>
</tr>
<tr>
<td>N</td>
<td>Yeah</td>
</tr>
<tr>
<td>R</td>
<td>Now that was that week and the week afterwards. I think I told you to put some bass in it didn’t I. You weren’t terribly confident about adding anything else to it were you?</td>
</tr>
<tr>
<td>N</td>
<td>No</td>
</tr>
<tr>
<td>R</td>
<td>So I really liked what you’d done</td>
</tr>
<tr>
<td>N</td>
<td>And I added the ...</td>
</tr>
<tr>
<td>R</td>
<td>Bass</td>
</tr>
<tr>
<td>N</td>
<td>Yeah (listens to Nat Project2)</td>
</tr>
<tr>
<td>R</td>
<td>And much to my surprise you managed to play it in time as well.</td>
</tr>
<tr>
<td>R</td>
<td>Now that was it, you’d said you’d done enough and then for some reason on the</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>N</td>
<td>last week you</td>
</tr>
<tr>
<td>N</td>
<td>Added heaps</td>
</tr>
<tr>
<td>34</td>
<td>R</td>
</tr>
<tr>
<td>R</td>
<td>Now what made you do all that and how did you work out how it fitted?</td>
</tr>
<tr>
<td>N</td>
<td>Well first Dane was in here and he had the keyboard that had all different sounds like tinker bell and everything</td>
</tr>
<tr>
<td>R</td>
<td>But you had my synth that had all of that</td>
</tr>
<tr>
<td>N</td>
<td>I know but I nearly went through all of them and then I found some really good sounds and put them in</td>
</tr>
<tr>
<td>(Plays Nat Project 3)</td>
<td></td>
</tr>
<tr>
<td>N</td>
<td>Harp,</td>
</tr>
<tr>
<td>R</td>
<td>It sort of works doesn’t it. Now you didn’t contemplate adding any sounds or voices to it</td>
</tr>
<tr>
<td>N</td>
<td>I refused to do that.</td>
</tr>
<tr>
<td>R</td>
<td>Why?</td>
</tr>
<tr>
<td>N</td>
<td>Because first I would have taken longer to think of words, so I would have been under the time limit, and then trying to get the right voice.</td>
</tr>
<tr>
<td>R</td>
<td>Of your own. Ok</td>
</tr>
<tr>
<td>N</td>
<td>Yeah</td>
</tr>
<tr>
<td>35</td>
<td>R</td>
</tr>
<tr>
<td>R</td>
<td>When I give you this to take home do you think you’d probably write some words to it and maybe a tune?</td>
</tr>
<tr>
<td>N</td>
<td>I might, me and my sister. Might get some things, but the only problem is it’s probably too short to sing to.</td>
</tr>
<tr>
<td>R</td>
<td>Yes but you’ve got it here at school so you could cut and paste it couldn’t you</td>
</tr>
<tr>
<td>N</td>
<td>I could add some more to it ‘cause after this jump, there’s more drums after it and it continues on and on so I could.</td>
</tr>
<tr>
<td>R</td>
<td>Now I like the way you changed the middle part. Is that ‘cause you needed a chorus or</td>
</tr>
<tr>
<td>N</td>
<td>Yeah</td>
</tr>
<tr>
<td>R</td>
<td>Or you just needed to change?</td>
</tr>
<tr>
<td>N</td>
<td>Just needed to change, ‘cause the drum beat changed as well.</td>
</tr>
<tr>
<td>R</td>
<td>And how did you choose the notes?</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>N</td>
<td>Um well I thought of a normal band, and some bands have guitars in it, so I have a guitar in it somewhere.</td>
</tr>
<tr>
<td>N</td>
<td>Harps, I like the harp so I added that in and then came the tinkerbell. And I thought I needed a name and I just went through the thing and I picked out a tinkerbell ‘cause I was going through all the things on the keyboard thing. And I liked the sounds so I just played some sounds. And then I came up with the name ‘Tinkerbell’.</td>
</tr>
<tr>
<td>N</td>
<td>I’m sort of interested in how you … you’ve got the sounds, the patches here, but how you decided to choose some notes or repeat some patterns. You just … by ear, you thought that sounds all right?</td>
</tr>
<tr>
<td>N</td>
<td>Yeah. I played it and then I had the sound and I just played notes and if I liked them I just recorded it on.</td>
</tr>
<tr>
<td>N</td>
<td>And then I just kept adding all different sounds.</td>
</tr>
<tr>
<td>R</td>
<td>One thing I like about what you did here, is that you’ve actually not used lots of notes.</td>
</tr>
<tr>
<td>N</td>
<td>I didn’t want to put too much notes in because of um, how it would sound and another thing. I wanted it to be different because you’d not usually you’d hear a steel guitar with a harp and tinkerbells and everything. So I wanted it to be different.</td>
</tr>
<tr>
<td>R</td>
<td>And it worked well.</td>
</tr>
<tr>
<td>N</td>
<td>Yes.</td>
</tr>
</tbody>
</table>

Quite clearly, Natalie was making creative decisions in advance of making sounds. She wanted rock band type instrumentation and she wanted a tune to go with the beat. She became a little stuck after she had the drums and melody. It was difficult for her to take the next step. At my suggestion, she included a bass part. Knowing which notes to play was a problem, I suggested that she could try a one-note bass playing four to the bar. I explained my choice of note (E); I demonstrated that idea for her and left her to it. She liked the suggestion and began recording her bass line. She chose to stay with the one-note line but added rhythmic variation in the chorus.
She was very excited by what she had created but until the last session, was reluctant to add any more. During Session 10, she managed to add a guitar, a harp and the tinkerbell sound. As well as recording the whole thing into Cool Edit, adding a vocal introduction and mixing down. Her clear understanding of what she wanted and her desire to keep it simple shows a remarkable intuitive maturity.

**Conclusion**

Throughout the study and despite her vacillations, Natalie has demonstrated a mature understanding of the software. She is happy to admit that she got stuck a few times ‘but then I fix it’ (I 2.26) she says.

She was the only participant with any reservations about using sounds that I had created. When asked if she liked using them she said, ‘They were all right to listen to. A bit harder to put music to it but …’ (I 2.21) She indicated that at first it was okay to use my sounds but what she really wanted to do was to make her own. That is why she preferred Cakewalk.

Natalie’s choices in her ‘Tinkerbell’ piece also show an understanding of the software. It can be argued here that the software has enabled Natalie to achieve far more in her composition than she could possibly achieve without it; for her to compose to a level beyond her musical skill.
Tessa’s Story

Tessa is in Grade 5. She sees herself as being good at literacy and reading. At school she enjoys computers, music and practising for the school play. She is a competent computer user with good skills in Word, PowerPoint and MicroWorlds, she is developing skills in FrontPage and Paint Shop Pro. She is a regular visitor to the computer room before school and at lunchtime, when she likes to play games, work on projects or assist me setting up.

Tessa has never had formal music lessons except for classroom recorder at school. She has a keyboard at home which she likes to use about half an hour a day. When on the keyboard she ‘just muck(s) around with the sounds and stuff’ (I 2.2) and plays ‘songs that (she) likes playing. (I 2.3) She also tries to work out pieces; she used a good attempt at the beginning of Mendelssohn’s ‘Wedding March’ in her ‘Wild’ piece.

Cool Edit

Tessa said that she found Cool Edit ‘easy to use’ (I 2.7). She used it well and managed to mixdown, transform waves with effects, change volume and pan envelopes, loop duplicate, import and splice files. Her biggest problem was with saving. All the way through the study she had trouble saving imported files to her own folder. She had no trouble creating folders and saving her sessions into them, nor did she have any trouble saving new files into those sessions. She seemed to fail to realise that imported files need to be saved as new files in a session in order to access them within that session.
This only caused problems when trying to access her work from different computers or when saving to CD.

As with other participants, Tessa at times recorded sounds too loudly or didn’t compensate volume levels when adding some effects. This resulted in clipping (distortion of the signal) especially in mixdowns. This was not a problem that I had discussed with the participants and requires skill and finesse to avoid or correct. It is worthy of mention here as it affected Tessa’s piece, ‘Wild’ (T53), more than any other participant’s pieces. When I played a remixed version with less clipping, she was aware of the difference.

**Cakewalk**

Tessa found Cakewalk harder to use than Cool Edit but still managed to use it effectively. As with most participants, Tessa under-utilised Cakewalk, using it more as a source of drum beats and sounds than as a compositional tool in its own right.

When asked if it was using the keyboard or just the program that made it harder she said that it was ‘harder with the program’ (I 2.12). She was not able to articulate clearly the difficulties, but what was hard was that ‘you had to go into the piano and all that’ and how ‘you can change sounds and stuff’ (I 2.12).

**Her Music**

From the very first session, Tessa appreciated the idea of four-track recording. She used each track appropriately and attempted to create whole pieces, rather than just
groups of sounds. As described above she had no problem with loop duplicating and other technical aspects of the program.

The first session was very much discovery and simple tasks, Session 2 introduced the microphone and recording your own voice. Tessa, perhaps inspired by the weird sounds she and the others were creating, came up with the line ‘does your music sound like you’re strangling a chicken?’ This line became the basis of her piece. (T48) She experimented with effects and played with the volume controls and then looped it repeatedly through the piece. Her ‘chicken’ piece occupied her attention for the next two sessions. She imported drums and additional sounds and experimented more with transforming her voice. By the end of Session 4, however, she seems to have run out of ideas or motivation for the piece. Although she had created a large number of files for the piece she finished Session 4 without a completed mixdown with which she was happy.

Her Cakewalk sessions saw her working with Natalie: not a successful partnership for either girl. Each wanted to work in her own way and neither seemed prepared to compromise. They did produce a very interesting Bach piece (Nat Tessa Bach Cakewalk) and despite just ‘mucking around,’ (I 2.14) their piece, ‘Crazy’ (T36) impressed me in its structure. The way it clearly built from very little into a cacophony.

Her project piece, ‘WILD!!!!!!!!!!!!!!!!!!!!!!!!!!!’, (T54) developed over the four weeks allowed. She had an idea to make a rock concert piece. She wanted to include sounds of the band, someone counting in, the band getting it wrong (Tessa8 Sorry - T52) and so on. Her difficulty with saving files to the correct place caused Tessa some major problems in locating files from week to week. She also spent a lot of time
experimenting with sounds and effects and trying to get her recorded tracks correct. As a result she was not happy with her progress by the final session. Given an impending deadline she seems to have focused on her task and come up with her finished piece.

‘WILD!!!!!!!!!!!!!!!!!!!!!!!!!!’ is interesting as a piece for a number of reasons. She has used both Cakewalk and Cool Edit to create sounds and managed to record into Cakewalk and then into Cool Edit as instructed. Unfortunately she didn’t save the Wild session, only the component waves and the mix, this meant I had to reconstruct it in order to analyse it. It is hard to tell whether she has constructed her piece purposefully or whimsically but the amount of time given to it indicates that even if the notes were accidental, the decisions to use or not use components were deliberate.

She has structured the piece to create a build up to a climax and to demonstrate an attempt at counterpoint and harmonic structure. As odd as the piece might sound there is appeal and there are easily recognisable aspects – Mary Had a Little Lamb and The Wedding March.

**Conclusion**

Tessa’s work was often slow and usually disorganised but she demonstrated a good grasp of the fundamentals of both programs and an understanding of their applications. Her creativity is clear, as is an underlying humour.

She enjoyed the project and has revisited some of her pieces in her own time. She is comfortable with her ability to use both programs and in her ability to teach others.
Thomas’s Story

Tom is in Grade 5. At home he has a fairly old computer that he says he doesn’t use much. He likes to use the internet to ‘look up sites’ and sometimes he ‘just (teaches his sister) how to play Word and write and teach(es) her how to play PowerPoint as well’. (I 1.16) His dad wiped off the games he had at home so all he plays is solitaire and minesweeper.

Tom has never had formal music lessons nor does he have any instruments at home. He does like to ‘muck around’ (I 1.23) on a friend’s piano. He likes to ‘hit anything and just try to make up stuff.’ (23)

He sees himself as good at computer and is a competent user of Word, PowerPoint, MicroWorlds and FrontPage. He had not used or heard of Cakewalk or Cool Edit prior to this project.

Throughout the study, Tom worked alone, with Dane or with Jed. He felt that he and Dane ‘were acting around a bit’ (I 1.20) but enjoyed working with Jed. When asked what his favourite thing was he replied that it was

‘listening to the sounds what we did and mixing them down. Like when I … oh my favourite thing was keep going and stuff, and changing it like with Jed. ‘Cause we came to really hard bits where we couldn’t decide what to do.’ (I 1.20)
Cool Edit

Tom managed to complete all set tasks and in my opinion used all the required facilities of both programs to create some interesting compositions. He felt, and was the only participant to express this, that there was a lot more he needed to know. He described Cool Edit as ‘a really funny and interesting program, it was really complicated with all the buttons and stuff I couldn’t understand.’ (I 1.18) When asked if he was okay using it he was not sure, even though he had demonstrated competence in understanding four-track recording and mixing down. It could be argued that although Tom used the program to a required level, he could see the potential of the program and although not intimidated by his lack of knowledge was aware that he knew less rather than more about the program.

Cakewalk

Although Tom attended all the Cakewalk sessions he felt that he had ‘missed heaps’ and that he usually ‘wasn’t here when we used Cakewalk so (he) didn’t understand.’ (I 1.26) I am not sure why he felt like this but I believe it is because he started working with Dane and there was a lot of mucking around going on. Transcriptions of the first Cakewalk session (S 5) indicate considerable non-work related conversation and Tom expressing concern about Dane’s behaviour.

When asked about the relative levels of difficulty between Cool Edit and Cakewalk, Tom said he ‘found Cakewalk was just about the same really but Cakewalk had a bit too many buttons. They should have had just a couple of buttons to go on.’ (I 1.26) He said that he thought the reason people didn’t use the black notes for their pieces in
Session 8 was that they ‘didn’t want to feel that they weren’t going that good and … they were getting put down because they couldn’t do it.’ (I 1.27) This could be a reference to my comments about his piece with Dane: ‘It is pretty dumb’ (S 6. 40 - 41) There was no indication made of this to me during the session, but that does not mean that Tom did not feel it.

Tom did use Cakewalk throughout his project but he and Jed did not actually use it to record midi data. Rather they used it to locate midi drum tracks and interesting keyboard sounds. When these items were located they were recorded directly into Cool Edit. There is nothing wrong with this practice, but it is a bit of a waste of hard disk space and it does not utilise the full capabilities of Cakewalk.

See the section, Cakewalk, in Dane’s Story, above for a discussion of some of Thomas and Dane’s work.

**Project – I am Immortal**

Tom hit a major obstacle in his project. I thought he had written some remarkable lyrics:

I am immortal

I have the blood of kings and queens

I have no rival, no man can be my equal.

Take me to the princes of you all.

When asked about these lyrics, Tom explained that he was
‘just thinking of my book that I read, there’s a series of ‘red wall’ it’s sort of this warrior and it’s got all words in it that I can’t understand so one day I looked up in the dictionary and every word I put down, that I didn’t understand, so I made it out of them.’ (I 1.32)

It turns out that knowingly or unknowingly, Tom had borrowed the lyrics from Queen’s ‘Highlander’. He has not quite copied them exactly but the similarities are obvious.

He turned up with them for Session 8 with every intention of turning them into a song. He had an idea about rhythmic accompaniment but couldn’t identify it. His approach was to play around with sounds till he found the right one. I thought that the piece would be suited to a rap beat and provided him with some examples; he was not impressed. He found a basic rock beat and went with that. He and Jed spent a long time just recording the vocals and trying to find sounds. I think they deleted more than they kept. At some point they found a great sound on the Roland keyboard and left the ‘Immortal’ (T57) piece to work on ‘Scary’(T60,61).

Jed was away for the final session and I suggested that Tom overdub his voice and split it up to try and get him to complete his piece. Tom had found a backing drum track by now and he followed my suggestion. He recorded himself again, split his voice up and added effects and loops. Apart from the initial suggestion, I did not provide him with any further assistance. That one suggestion was enough for him to refocus and continue with his creative process. He was pleased with his results.
Conclusion

Tom’s uncertainty about his understanding of both programs perhaps indicates a real understanding of their complexity and of his own learning. His work throughout the study indicates that he is more than competent in his use of both programs, especially for his age. He attended an event at school called, ‘Talk, Talk, Talk’ after the project but before the final interview. He observed that the presenter was using Cakewalk differently to the way we had used it. He noticed that the presenter ‘could make it like say how Cool Edit shows you how you are recording it. You can make Cakewalk into Cool Edit and that.’ (I 1.30) Tom is referring to Cakewalk’s ability to be used to record waves as well as midi data. I had not showed the participants this function, as I did not wish to confuse them.

Tom is confident that he could teach others how to use the programs and that he could use Cool Edit at school. He felt that he would probably use Cakewalk when he is older. (I 1.29) He enjoyed participating in the study and in particular liked ‘working with the people in here.’ (I 1.32)

Parent Responses

At the conclusion of the study, parents were asked for their thoughts and responses. They had already received a copy of their child’s work and of the finished work of the other participants. Parents were asked to rate their responses to the following ten questions:
I liked the work my child produced.

The standard of work produced was high.

I thought that the work showed well-developed skills.

Before this project I thought that my child was very musical.

I have always thought that my child is creative.

I thought that my child’s work showed creativity.

I thought that the other children’s work showed creativity.

I am pleased my child participated in the project.

I believe that my child has learned some valuable skills.

I had not thought my child capable of this type of work.

The questions were rated:

Strongly Agree – 5

Agree – 4
Don’t Know – 3

Disagree – 2

Strongly Disagree – 1

The question ‘I had not thought my child capable of this type of work,’ was poorly worded, allowing for a double negative in the response, and subsequent confusion.

Seven out of the eight parents returned their questionnaires.

The parent response was overwhelmingly positive. Informal discussions that have taken place at school with some of the parents have supported that response.

Not surprisingly, every respondent agreed – six strongly agreed, one agreed - that they were happy that their child participated. Only one parent strongly disagreed that their child was very musical, one disagreed, three didn’t know and two agreed. (See Figure 4.1)

Parents were also requested to add their own comments.
Figure 4.1 Parent Questionnaire Responses

Parent Comments

The parent comments were as follows:

Wasn't what we expected, I suppose we thought it was more structure. But we were impressed with the variety. Was the intention to give the children their interpretation of what the instructions were?

Overall, Natalie enjoyed it and likes others work also.

M. – Natalie
Thanks Nick, for giving Melissa time on this project, and it seemed once they all got started you gave them free rein on what they wanted to do.

We enjoyed the mix of songs on Melissa’s tape, hope your project went well.

\textbf{M. & L. – Melissa}

Jessica really enjoyed participating in this study. She has been learning piano for about 2 years and has some musical understanding – but she really enjoyed being able to ‘play’ with musical concepts and techniques.
The thing she probably enjoyed the most was access to fairly sophisticated software (she hasn’t stopped asking us if we can buy a copy!). She also enjoyed being able to do pretty much whatever they wanted with it.

Things Jessica enjoyed most were – mixing tracks on Cool Edit 2000, using the organ and making up the story.

\textbf{K. – Jessica}

I am pleased Jed had the opportunity to participate, particularly as he enjoys music but is not very musical. I think he learnt quite a bit, it was good for him to work with different kids and see what others did, and I feel it improved his self-confidence. He did comment that your instructions were ‘long and boring’ and he already knew it all (at the start of each session). Well done and thanks.

\textbf{N. – Jed}

Tessa just loved being involved in the project and I was very impressed with the level of skill capable of 10 - 11 year olds. While I enjoyed listening to the completed pieces, I don’t think they displayed evidence of any great musical gifts!
M. – Tessa

I was impressed by the quality of the recording and believe that the children were able to explore concepts that are normally outside the curriculum at the primary school level. Thank you Nicholas for giving the kids the opportunity.

M. – Dane

I feel Tom got a lot of pleasure from creating something which was his and also enjoyed the joint participation.

C. – Thomas

Conclusion

The comments from parents supported the questionnaire; the response was very positive. It is interesting to note the inference that the sessions were unstructured and free. This response does not seem to be a criticism, rather an observation. My teaching objectives were to establish clear expectations, provide information about the required skills and then let children explore the software and their creative desires. It is apparent from the comments that the parents have listened to their child’s work and the work of the other participants.

I believe that the responses from parents are supportive, positive and encouraging. They demonstrate surprise at the standard of work and approval of their child’s participation.
CHAPTER 5

Analysis

Why bother with the musical notations of children when hardly any of them will become professional composers? Composing is a fundamental human activity, whether we compose with words, with blocks, with paint, or with tones ... Giving access to the many languages of the human mind is the work of education. (Bissex, in Upitis 1991 p. ix)

Introduction

The study set out to investigate how professional level music software could be used as an effective learning tool for creativity and composition in primary school aged children. It had to establish if the software could be used at all, whether children could use it creatively and whether children could use it to compose. Conclusions as to whether or not it could be used as an effective learning tool and how it could be so used were dependent upon the analysis and interpretation of the data that had been collected. Accordingly, a flexible research design (Marshall and Rossman, 1995) was adopted and from the outset, contextualization (Maxwell 1996), or the attempted understanding of data in context, became necessary.

This chapter looks at how the study was presented, what the results indicated and how the data was interpreted. Using the definitions of creativity and composition as outlined in Chapter 1 and by placing them within the context of this study, this chapter
provides an analysis of the children’s work and draws conclusions about the effectiveness of the software and the children’s use of it in the compositional process.

Analyses will be made of the children’s ability to master the software, their ability to use the software and the products they created using the software. Detailed discussion of individual participants occurs in Chapter 4, this chapter looks at specific interactions and results. I have chosen to look in detail at specific compositions, rather than every piece, as the limitations of the study prohibit such detailed examination. I will use my experience as a classroom music teacher, a composer, a musician, and an expert user of the software to make judgements about the creative process and the compositional merit of the pieces.

**Measurement**

Hickey (2001) discusses two ways of rating creativity: ‘Webster’s 1994 Measurement Of Creative Thinking in Music-II; a measure of divergent thinking factors, as well as the convergent factor of musical syntax.’ (p. 2) and Amabile’s (1996) proposal ‘that the most valid way to measure creativity is by using experts’ global and subjective assessment of creative products.’ (p. 2)

Hickey’s is an attempt to find the most valid measurement of creativity in children’s compositions. This study has not sought to measure creativity but rather to discover how professional level music software can be used to assist creativity. Given that qualification, and the fact that as participant observer it was my role to assess the product, it is relevant to this study to reiterate Hickey’s findings. She states:
It seems the best "experts," or at least the most reliable judges, may be the very music teachers who teach the children ... Perhaps the extensive music training that music teachers have, along with their experience in the classroom with children, provides them with the tools necessary to make consistent and valid judgements about the creative quality of children's original music products. (p. 5)

Accordingly, as a trained musician and music teacher with many years experience as a primary school general classroom music teacher, I am well qualified to assess the creative output of the participants in this study.

**The Software**

The children were set open-ended compositional tasks; these tasks included cutting and pasting sound clips to produce a mixed piece, a voice-over with background music, a four-part midi piece using drums and free choice for the final project.

**Cool Edit**

All children, at some stage, experienced difficulty saving their files correctly using Cool Edit. This problem manifested itself in two specific ways: saving work to the wrong folder, or not saving whilst working and being left with multiple untitled 'takes' (files that are the attempts made at recording - Cool Edit does not destroy 'takes' unless instructed.) Cool Edit creates session files in which it stores session information, if files are not saved to the same folder as the Session file they can be difficult to locate.
These problems were not unexpected, as they are problems that I have faced in my own use of the software. By the Project Session, however, all participants were working confidently with Cool Edit and were saving their files appropriately most of the time.

Below is a list of expected outcomes for each session.

Wave Placement: When wave files are placed over each other, they can distort, are hidden and make the session difficult to mix. Correct placement solves this problem.

Files Grouped: Unless files are saved in the same folder as the session they can become lost. Correct grouping solves this problem.

Re-named Waves: Re-naming pre-recorded waves allows alterations to be made without changing the original. New files will be created as, for example, Track 1.1, they need to be renamed when saved.

Transform Effects: The application of echo or other effects to change the sound qualities of a wave.

Voice Over: The inclusion of recorded voice into the piece, as required.

Mix Down: Production of a final mixed track.
Each outcome was rated using a Lickert scale:

Very successful – 5
Successful – 4
Required help – 3
Unsuccessful – 2
Very unsuccessful – 1
Not applicable – 0

The categories, Wave Placement, Files Grouped and Renamed Waves, were ranked by reviewing the child’s work files and working out the percentage of errors in each session. For example, if a child’s session contained ten waves and one of those waves was saved to the wrong place, they scored 90%. If a child was absent for a session, that session was not rated.

The categories, Transform Effects and Voice Over were rated according to my subjective assessment of the work. If a child did not use the categories, Transform Effects, Voice Over or Mix Down, they were rated not applicable.

This rating process is not intended to be definitive, it is used only to give an impression of the participant’s competence with the software.

Figure 5.1 shows the effective use of Cool Edit over the first four sessions, expressed as a percentage. The areas of greatest difficulty were the grouping and saving of files within sessions. The overall effective use of the software was very high, and these figures indicate good levels of competent use in all areas.
Figure 5.1 Effective Use of Cool Edit

Figure 5.2 combines the individual student’s scores on expected outcomes over the first four sessions and expresses each as a percentage. The indication is of very high levels of appropriate and successful use.

Figure 5.2 Overall Successful Operation – Cool Edit
Figure 5.3 illustrates the scores for saving files correctly, the skill that students found most difficult. Given the difficult nature of file saving these results still demonstrate a reasonable level of success.

![Figure 5.3 Grouping of Files Sessions 1 – 4 Cool Edit](image)

By the end of the study, all participants, with the exception of Tessa, were being very successful in their file saving. Tessa’s results may have been affected by her working on two projects at the same time: Chicken and WILD!!!!!!!!!!!!!!! Natalie was not using Cool Edit during Sessions 7, 8 or 9. Figure 5.4 shows the success rates, expressed as a percentage, for the last four sessions.
Figure 5.4 Grouping of Files Sessions 7 -- 10 Cool Edit

Cakewalk

Despite the expression of a preference for Cool Edit over Cakewalk by most participants, the actual usage of Cakewalk was very successful. Figures 5.5 and 5.6 reflect how well each function was used as well as how often.

Expected outcomes for Cakewalk were:

Change Patch: Change from the original patch (sound) to another.

Add or Change Notes: Use the pencil tool in the Piano Roll view to add notes to a piece or to change their length.
Copy and Paste: Copy and Paste tracks or sections of tracks from one project or track to another.

Alter Pitch: Use either the pencil tool or the transpose function to change the pitch of notes or sections of music.

Record: Arm tracks and use the record function.

Use Drums: Access drum sounds from Cakewalk or through the keyboard and use them in a piece.

Four Tracks: Use at least four tracks to record, play and manipulate midi data within a piece.

Each outcome was rated using a Lickert scale:

Very successful – 5
Successful – 4
Required help or Only attempted once – 3
Unsuccessful – 2
Very unsuccessful – 1
Not applicable – 0
Figure 5.5 Individual Effectiveness – Cakewalk

Figures 5.5 and 5.6 show good levels of success in most areas. The use of drums proved difficult for some participants. Since the General Midi drum patches are automatically assigned to Track 10, some specific understanding of track assignment was required. This could well have been a contributing factor to the lower level of successful drum use. The levels of success are still reasonably high.

Figure 5.6 Overall Effective Use - Cakewalk
The Pieces

In assessing the pieces I looked for all or some of the following:

- An indication of originality
- Creative decisions rather than accidents
- Application of aesthetic values by the composer
- Aesthetics of the piece to the listener
- An effect of the software on the process
- Use of form and harmonic structure

All my decisions were, of course, subjective but rely on my years of teaching and musical experience. I also bore in mind the requirements that were set for each piece.

Tinkerbell

'Tinkerbell' (T35) is a remarkable achievement. Natalie has no musical training, yet she has managed to create a piece that demonstrates an intuitive understanding of form and harmony, and the ability to use that understanding creatively.

Natalie constructed the piece around a drum track that she found in the Cakewalk sample files. Accordingly, her use of form has been influenced by the drum track, as have considerations of style and melodic structure. This does not diminish the composition; it could be seen to enhance it by demonstrating her ability to work appropriately within a formalised structure.
The piece is in four/four time (four crochets (or \(\frac{1}{4}\) notes) in each bar). It uses a simple A A B structure: the ‘verse’ is played twice followed by the ‘chorus’. Both sections use repeated four bar phrases. A simple melody is carried by the piano in the A section and by the guitar in the B section. The piece is complete, yet Natalie has indicated that she could extend it – using the same form.

Because Natalie used a template that I had created to set out her composition, the parts are not in any specific order. Figure 5.7 is a notated version of a four bar phrase of the A section of ‘Tinkerbell’. This version was taken from Cakewalk’s Staff View; the notes themselves are automatically generated, not written intentionally by the composer. The parts are as follows:

5: Seco Acco – Harp

6: Seco Melo – Guitar

8: Alte 2 – Bass

9: Alte 3 – Piano
The harmonic structure of the piece contains the characteristics of a Dorian scale in D—all the white notes starting on D. The bass is anchored on E and the harmony from the guitar sits a minor seventh above the melody. A contrasting ostinato in the harp gives the music an E minor feel.
The B section (Figure 5.8) drops the piano line and uses held notes (still on E) in the bass. The harmony becomes somewhat dissonant at this point with an F in the harp, against the E in the bass. Here, the tonality lends itself to C major (using the dominant 7th, G, B, D, F), but the use of the E pedal note in the bass, unsettles that tendency.

Natalie spent a long time, at least three sessions, working on ‘Tinkerbell’.

Unfortunately, I was not able to see what she discarded: only what she kept. I know that for much of the time she was engaged in a process of trial and error. In her final interview, Natalie discussed her creative decisions in ‘Tinkerbell’ (see Chapter 4), she said:

Well I played it and I thought in my head a good beat that would go with it, and this is it.

Well I thought, first I thought of a sound. I played around with the keyboard and picked out a really nice sound that went with the music. And then played other sounds with it. And then picked out all different keys and then thought in my head a tune, like a tune to go with the music (I 2.32)

Her decisions were guided by her understandings of what a rock band should sound like and what sounded good to her. She has applied these understandings and aesthetics to the piece and has ended up with a successful piece of music that is pleasing to the ear. ‘Tinkerbell’ was very well received by the other participants.

The production of a piece of music of some 32 bars in length, containing five parts, including drums, would have been beyond Natalie without the software. The use of
computer software has not only allowed the product to exist but has been instrumental in the creative process. It has allowed Natalie to compose whilst listening to the other parts, to revise and to make creative decisions.

Jed22

I chose this piece (T20) to analyse for three reasons in particular: it is quirky, it is unstructured and it is composed by the person whose parents rated him very low in musical ability.

Jed’s approach throughout the study was analytical and quite technical: this goes here, so this must go here. He used sounds and combinations of rhythms that would test the ear of any listener. All his choices, however, were deliberate. He listened to his work as he progressed, made changes and made decisions using his aesthetic values.

The second piece Jed wrote, simply entitled, Jed22, (the date was the 22nd) shows a humorous, and whimsical element to his work. It is certainly an odd little piece, but one that demonstrates a creative output well beyond what would be possible without this type of software.

Jed has used some of the pre-recorded sounds that I made available to all participants, as the basis for his piece. It is really a collage of sounds; there is no traditional form, no A section followed by a B section; the piece moves through a series of sound events. A deep bass sound opens the piece and continues throughout, hidden in the background is Jed talking about himself; ‘Hi my name is Jed and I go to ... school, I’m in the computer room making music programs.’
Track number 2 plays over the top of this monologue, it consists of Jed singing ‘bow, wow, wow’ - a little tune that he made up. This has been treated by Jed using delay and phase shifting. The tune leads into some background sounds and then a recording of my response to a question Jed asked in order to record my voice. Jed recorded all the sounds used in track 2 first, and then treated and mixed them into track 2.

Unfortunately, the component tracks were not saved, but the process is distinguishable to the informed listener. A synthesised laughing track overlays the piece and a repeated section from Supertramp’s ‘Bloody Well Right’ adds impact. Another synthesised sound, ‘tape spin’ fades with the bass to the end.

The construction of Track 2 in particular, demonstrates clear and considered creative decisions being made by Jed. The effect of the whole piece is that of a contemporary soundscape. Whether Jed intended that effect is not clear. What is clear is that Jed carried out actions based on his interpretation of what sounded good, it is also an original piece, created from Jed’s manipulation of sounds. It would not have been possible for Jed to create this piece without the software. It is also apparent that by offering him the ability to manipulate sound, to alter it and to move it around, the software has influenced Jed’s creative decisions.

WILD!!!!!!!!!!!!!!

I have chosen WILD!!!!!!!!!!!!!! (T54) as a piece for analysis mainly for its oddity, but also for its construction. It is an unusual piece that has aspects of collage, story telling, melody and chaos.
Beginning with Tessa’s idea of a rock concert that goes wrong (‘rock concert’ was her original title), Tessa moves into a drum track over which she layers different themes. A bird tweet is first, leading into ‘Mary Had a Little Lamb’ played on piano. Played in time with the drums, ‘Mary’ leads into a melodic telephone/piano track, with a rhythmic pan flute played very low. The piece at this point, gives an impression of building and the shifts from sound to sound, although unusual, occur quite naturally. Tessa then introduces an attempt at Mendelssohn’s ‘Wedding March’ played appropriately enough, on a church organ. The technical ability to play the ‘Wedding March’ eluded Tessa and she instead maintained a rhythmic consistency but deliberately messed up the notes.

Her technical skill is demonstrated soon after the organ goes wrong; she manages to insert a new, and different drum track over the original, but maintains the tempo. This can be quite difficult to achieve. The only concession to timing she has made is to extend a bar of the original drums by two beats. Not only does she change the drums, she changes the way they are recorded. The second track is recorded with the microphone on, so that room sounds are picked up as well. In addition, she has added effects to the second drum track.

The overall impression of the piece is one of calculated chaos; many of the sounds are unusual, but they have been placed carefully and the piece has rhythmic and harmonic integrity. Whether the placing of instruments was accidental is not relevant to the quality of the piece. The final product is not an accident, Tessa only kept those files she wished to use.
Tessa was very happy with WILD!!!!!!!!!!!!!!!, it was different from what she started out to create but it satisfied her aesthetic values. The piece was not well received by most of the other participants: only Melissa and Jessica indicating approval. For me, the piece is extremely successful and works on many levels, including the harmonic, rhythmic and structural, as well as the comic.

This style of collage is a successful use of the software and could not have been achieved without it.

Despite the noise and unusual nature of WILD!!!!!!!!!!!!!!!, there were creative decisions being made throughout its conception. Tessa spent a lot of time recording and re-recording pieces, she has made creative choices in an attempt to achieve an end with which she was happy.

**The Dragon and The Unicorn**

The piece (T28) is a good example of the effectiveness of the software as a learning tool in creativity. Jessica and Melissa have written a story in which the plot is decided as much by the availability of sounds and music, as it is by any other factor.

The recording of their own voices was an aspect of the study that Jessica and Melissa loved. Accordingly, they recorded their own voices at every opportunity throughout the study. ‘The Dragon and The Unicorn’ is an unfinished narrative, which features both girls playing the parts of the characters in the story. None of the text was written down, instead all drafting occurred through discussion and recording. The narrative is accompanied throughout by incidental music; piano and drums.
Technically, the piece is quite crude: different recording levels, distortion and gaps between sections. Yet put in the context of a primary school classroom, these technical problems diminish. What is important for this discussion is the appropriate use of voice characteristics, appropriate musical styles, good use of the software and the compositional process.

Despite the technical problems raised above, the girls have used the software (Cool Edit) extremely well. They have managed their files appropriately, they have used reverb effects to enhance their music, they have recorded small ‘takes’, each one a different part of the story, to allow for easy identification and organization of their files.

Of particular interest is the writing and drafting process, and the role of the software in that process. Both girls are comfortable writing stories and do not have difficulty using the written word. For this composition the writing was all spoken. The software allowed them to bypass the actual writing down of their story, it also allowed them to add sound effects and music as they were working; to compose at two levels at the same time – text and music. There are implications here, for students with learning difficulties that could well deserve further study.

‘The Dragon and The Unicorn’ is a demonstration of a different compositional style – narrative. The girls have used the software to create a piece that they are proud of and would like to finish. The incidental music and the development of the story line show the girls’ creative decision-making and aesthetic judgements.
CHAPTER 6

Discussion

All this fires my soul, and provided I am not disturbed, my subject enlarges itself, becomes methodised and defined, and the whole, though it be long, stands almost complete and finished in my mind, so that I can survey it, like a fine picture or a beautiful statue, at a glance. Nor do I hear in my imagination the parts successively, but I hear them, as it were all at once (gleich alles zusammen). What a delight this is I cannot tell! (Mozart (quoted in Ghiselin) cited in Gardner 1982 p. 358)

It would be unreasonable to presume that the use of any music software could elevate the user to the realms of the creative genius of Mozart, yet the quote above offers a glimpse into Mozart’s creative thinking. This study does not claim that music software can begin to approximate Mozart’s state of mind, but the notion of hearing your composition whole and finished, so that it can be surveyed, is appealing. Music software of the type used in this study allows the composer that opportunity. Not, unfortunately, like Mozart, ‘all at once,’ but certainly as a complete work.

When we paint or draw, we can stand back and survey our work; when we write we can see the words and hear them in our heads as we read our creation. Rare is the individual who can hear his or her music as they write it; can glance at a finished score and hear all the parts; can play all the parts on all the instruments – or even on the piano. The software used in this study allows the existence of that facility in everyone.
It helps open a level of creativity and composition hitherto unattainable – the ability to see and hear your work in its entirety, as it is composed.

This study has attempted to address the following research question:

In what ways can professional level music software be used as an effective learning tool for creativity and composition in primary school aged children?

It has sought to discover ways its effectiveness can be optimised, it has also attempted to address the following questions:

Can a learning environment be established where the children will be able to:

- embrace the technology?
- understand the interface?
- grasp basic concepts of recording and playing?
- work within a new and complex software environment?

A study of this size and scope can only ever hope to provide broad generalisations based on the data collected. It should provide information and ideas and serve as a reference for further investigation. What the study concludes is that in the manner set out in the preceding chapters, professional level music software can be used as an effective learning tool for creativity and composition in primary school aged children.

It assumes that a learning environment built around a motivated, skilled and knowledgeable teacher, in which children are introduced to complex and demanding
concepts through careful planning and support, can result in the successful application of those complex and demanding concepts.

It is reasonable to state that in this case, under these conditions, the participants worked creatively and successfully. They were in control of the technology, they understood the basic aspects of recording and they used the software to compose pieces with which they were happy and which demonstrated their creativity.

This study did not set out to quantify levels of creative success or levels of the effectiveness of the software to assist that creativity; it set out to discover if it could be used and if it was effective. Bearing that in mind it is still worthwhile to place the achievements of the participants into a curriculum framework.

The Curriculum and Standards Framework II (Board of Studies 2000) ‘provides a strong focus for teaching and learning (the curriculum) and clear statements of what students are expected to achieve (the standards) in eight key learning areas during the first eleven years of school.’ (p. iii) The Arts Key Learning Area (KLA), Music Strand, contains the following expected outcomes:

Level 4: (Grades 5 – 6)

- select and combine music elements to compose and improvise works that clearly express ideas
- evaluate the effectiveness of own compositions
Level 5: (Grades 7 – 8)

- imaginatively and perceptively combine the elements of music to create and expressively interpret works
- use experimentation and a range of sound sources to develop music ideas from starting points
- improvise and compose music using given structures

The works produced by all participants satisfy the above outcomes, including those of Level 5, which is a higher level than that in which the children are working.

The Victorian Curriculum and Assessment Authority provide information and assistance to teachers to enable implementation of the CSFII across the curriculum. The document, *Information and Communications Technology in Art*, (Victorian Curriculum and Assessment Authority 2001) details ways in which information technology can be used in the Arts KLA ‘to help students achieve the learning outcomes in the Art key learning area.’

It contains the following suggestions:

**Electronic Communication Level 4**

creates and sends messages with attachments, eg. creates and attaches a MIDI file of a composition and a text file that reports on the processes used and ideas explored in the recording, and sends them to a student at another school
Simulation/Modelling Level 4

uses software to compose, manipulate and combine elements of a composition such as rhythmic patterns, melodies and chord progressions

Simulation/Modelling Level 6

uses appropriate software to record or sequence a melody (pre-existing or composed by the student) then creates accompanying parts and arranges for an ensemble

The type of work undertaken in this study fits comfortably into the requirements of Levels 5 and 6, and easily surpasses the Level 4 requirements. That is not to say that the participants have produced works that would enable them to complete subjects at Levels 5 and 6. What has happened in the study is that they have been able to work at a higher intellectual and creative level than would normally be expected. The indication, from a curriculum delivery perspective is that professional level music software can be an effective learning tool.

It could be argued that this project focuses on the tools rather than on the art. Yet that is an important part of its direction: the use of tools in the development of artist expression. diSessa (2000) adds weight to the tools focus; 'Art critics talk about 'Art' and feeling; Artists talk about where to get the best turpentine.' (p. 109)
Implications

This project is not an advocacy for the introduction of a computer based creativity and composition program in Australian schools. It does not attempt to put forward a view that computers are the best way of encouraging creativity – far from it. It does not recommend the widespread upgrading of computer equipment in schools to accommodate music technology, nor does it promote one program over another, one theoretical perspective over another, or one teaching style over another.

What it does, is argue that in this study, based upon my experience as a teacher and musician, and on the data collected, the participants demonstrated their ability to function successfully and creatively in a professional level music software environment. It argues that these children could use the software to produce works that they could not have produced without it, it also argues that the project offered them a new and stimulating environment in which to develop a creative potential.

In my own music teaching I strive to develop understanding through creativity and expression. As children become more adept at composing and more familiar with working in a creative and improvisational environment, they begin to confront the problem of their own lack of skills (Upitis 1990). How can they communicate a musical idea? How do they instruct another to play that idea? How do they best notate a piece? How do they develop their own playing technique? How do they work within an ensemble? The use of computers in this process frees them of the restrictions of lack of skill and technique, allowing them to concentrate on the formalisation of ideas and on the completion of specific compositions.
The learning environment created for this study is not a typical classroom. It could be argued that any project could be made to work using a ratio of one teacher to eight students; maybe here is an argument for small class sizes. I believe, however, that professional level music software has been used, in this case, as an effective learning tool. Whether it can be so used in a normal classroom environment remains to be seen, as does how far the participants could go in their creative endeavours, if they were given the opportunity. Or perhaps this study has been merely an example of a creative flowering that accompanies experimentation and play in a new medium.

There are specific technical and financial obstacles to the implementation of this type of program into schools; there is also the requirement of professional development for teachers. A recent American survey of music technology in Illinois public schools advised:

Planners should keep in mind how limited these materials are in most school music programs and in teachers' homes. Less than half of all schools even have a computer in the music area. MIDI keyboards, CD-ROM drives, and music software are not widely available, either in schools or in teachers' homes. Notation programs constitute the music software that teachers use most frequently, but only one in five teachers uses even this type of software. (Reese and Rimington 2000)

The cost of addressing that situation would be astronomical, and the benefit has not yet been established.

New questions need to be asked about how a computer based creativity program could be introduced into schools and if it is necessary or beneficial. Discussions about the
value of channelling resources into that type of program are also required; how would it be funded? What curriculum areas would suffer as a result?

Conclusion

For me, creativity is the basis of culture, and culture is the basis of society. We continue to strive to understand creativity, learning and knowledge. We look for new ways to implement old ideas; we seek new ideas. As educators, we try to foster knowledge and knowing, learning and understanding. This project has, I hope, offered one small example of a successful teaching and learning environment. I recommend any interested teacher to take up the challenge of computerised music making and to reap the rewards. Always bear in mind, however, that in the end it is not the tool that defines the outcome, it is how and why that tool is used.

When starting this research project, I thought that I would be dipping my toes into the pool of a new idea; it has been much more than that. I have taken a long and refreshing swim in an ocean of creativity and understanding, and when I have rested I shall return to that ocean, better equipped and with more time and I shall have a really good look around.
References


Appendices

Appendix 1 Lesson Files

These lessons were originally in html format. They served as help files for the
participants. Re-formatting from html to word format has resulted in the loss of active
links and in alteration of page layout.

Appendix 1a  Lesson 1
Appendix 1b  Lesson 2
Appendix 1c  Lesson 3
Appendix 1d  Lesson 4
Appendix 1e  Lesson 5
Appendix 1f  Lesson 6
Appendix 1g  Lesson 7

Appendix 2 Plain Language Files

Appendix 2a  Plain Language Statement - Adult
Appendix 2b  Plain Language Statement – Child

Appendix 3 Track List for Audio CD (Attachment 1)
Welcome to hard disk recording with Cool Edit 2000
Open the shortcut on the desktop.

Your view will either be the wave view

or the Multitrack Mixer view. You can switch between the two views by clicking.

Notice how on both views there are some familiar menus.
Explore them file, edit, view, insert, window, help.
To start, we need to open a file
In the Wave view use file/open. You will see this window.
Appendix 1a

There are many types of wave files that you can use in Cool Edit. We will use files called Windows PCM (.wav) files. They are quite large in memory size but are good quality. You can also use .mp3 files which are good quality but much smaller.

Use the drop down menu to select the right file type. Use the "look in" drop down menu to locate the correct folder. Find a folder called "Lesson 1 waves" in my documents.

In that folder are some waves that I have recorded. Click on each one to hear them. Make sure Auto Play is ticked.

The files nic.wav and youm.wav are short drum sounds. Open each one and insert them into the multitrack view.

Right click and hold in the multitrack view lets you move a wave around. You can put them both in the same track or in different tracks.
Appendix 1a

Left click to select a wave. Left click and shift will let you select more than one wave. Put both waves into track one. Play around with how close or far apart they are to make a beat.

When you are happy with the timing select both waves and choose edit/mixdown/selected waves.

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<tr>
<td>Copy</td>
<td>Ctrl+C</td>
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</tr>
<tr>
<td>Cut</td>
<td>Ctrl+X</td>
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<tr>
<td>Paste</td>
<td>Ctrl+V</td>
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<td>Paste to New</td>
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<tr>
<td>Mix Paste...</td>
<td>Ctrl+Shift+V</td>
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<tr>
<td>Copy to New</td>
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<td>Insert in Multitrack</td>
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<tr>
<td>Select Entire Wave</td>
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<td></td>
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<td>Delete Selection</td>
<td>Delete</td>
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<td>Delete Silence...</td>
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<td>Trim</td>
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</tr>
<tr>
<td>Zero Crossings</td>
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<tr>
<td>Find Beats</td>
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<td>Auto-Cue</td>
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<td>Snapping</td>
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<td>Adjust Sample Rate...</td>
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<td>Convert Sample Type...</td>
<td>F11</td>
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<tr>
<td>Edit Tempo...</td>
<td></td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>
The wave view lets you work on individual files. The Transport is just like that on a video or CD. It lets you play, record, pause, stop, rewind etc.

This creates a new wave that is made up of the two (or more) waves that you selected. You will find it already open in the wave view window. Save it and then edit/insert to multitrack
Go to the multitrack view and you will see the new wave as well as the two original ones.
Right click on the original wave and click Remove Wave Block.
If you use Destroy Wave you get rid of them in the wave view as well.

Use Loop Duplicate to create lots of repeated waves.

Splice will let you break up a wave.
The green M button is mute. That turns the track off
The yellow S button is solo. That lets you hear only that track
Appendix 1a

The red R button is **record**. That lets you record on that track. Make sure it is only selected on one track.
The blue lines are the **pan envelopes**.
**Pan** is the side you hear the sound on: left or right.
You can draw **volume** and **pan** envelopes by click on the blue or green lines and dragging.
You must have this button selected

[Image]

or

The **multitrack view** lets you work on up to four files.
If you tick the **Auto Play** box you can hear the wave before you open it.
The window that opens when you choose **Loop Duplicate** lets you choose a continuous loop or an evenly spaced loop. Just choose how many repeats you want.

Keep going with other waves from the folder. You only have four tracks but you can insert waves into a track that is already used just by clicking in the track where you wish it to go.
You can **edit/mix down** waves to empty a track. Then remove the old ones from the multitrack.
Save your session in your own folder.
Lesson 2
Revision
Saving and Organizing Files
Recording
Revision
Open Cool Edit 2000
Click between the Wave View and the Multitrack View

Click on your file and it will open.

In the Multitrack View use file/open session or look at the list of sessions that appears at the bottom of the file menu.
Your last session should appear there.
Appendix 1b

Choose **Decimal [mm:ss:ddd]**
That will give you minutes, seconds and hundredths of seconds.

The loop in this picture is set for 11 seconds
A **session** is the piece you make in the **multitrack view**, which uses multiple waves.
A **wave** is an individual sound file.
In the left column are all the folders in the computer
In the right column are all the folders and files that are in the folder which is selected on the left.

Move some waves around on the Multitrack View.
Remember

**Left Click** to set you start position and select an individual wave
**Left Click and drag** to select an area.
**Left Click** and drag to select an area.

**Right Click** to see the edit menu.
**Right Click and Drag** to move.
**Shift/Left Click** to select an area from the start position

**Shift/Left Click and Drag** to select an area
**Ctrl/Left Click** to select more than one wave

Duplicate a wave use **edit/loop duplicate**
Using **view/display time format** will let you set the time display.
Appendix 1b

Saving and Organizing Files
Cool Edit lets you work with waves and sessions.

You need to be able to save both. And store them where you can find them.
Open Windows Explorer on your desktop.

Use file/new/folder to create a folder every time you wish to make a session. That way all your files will be in the same folder as your session.

When you want to save your session in Cool Edit use file/save session
The next window lets you choose where you can save.

Find the folder that you created earlier by using the **look in** box. If it is in **My Documents** open that, locate your folder, open it and click **save**. Make sure to give it a name that will mean something to you.
Recording
You can record in either the Wave View or the Multitrack View. All you have to do is press the record button. Just like on a video.

BUT
First you have to do a couple of things.
In the Multitrack View, you have to arm the track you wish to use.

In the Wave View, just click the record button.

But First
You have to make sure that your computer is ready to record.

On the Windows Taskbar
You’ll see a little speaker. Double click it.
That will give you this window. That shows you the volume level for each device that you are using.

Make sure that **mute** is NOT ticked.
Use **options/properties** to get to the next window.
This window will let you choose which devices are seen. Notice how **Playback** is selected.

If you select **Recording** you get this window. Tick the Microphone and Line buttons. The click OK.

You will then see this window.
To make the microphone work it has to be ticked. If you were recording an instrument and had it plugged into the Line input at the back of the computer, you would have to tick that.
Lesson 3

Setting up a voice over
Adding effects to waves
Deleting sections of waves

Setting up a voice over
Today we are going to make a piece which uses backing sounds and recorded voice.
You can use some poems that I have included, or your own words.
Remember that you need to think about which sounds are appropriate for your words.
Do you need drums? Is it fast or slow?
There are a set of new waves in Lesson_3_waves
Some of them are drum tracks, some are notes.

Adding Effects To Waves
Cool Edit 2000 lets you do lots of things to your waves.
Normalize - makes the wave as loud as possible without breaking up (distorting)
Amplify - makes the wave louder
Delay Effects - lets you change the way the wave sounds with echo, reverb and other effects.
You must be in the Wave File View

When you have selected the part you wish to transform use the Transform menu.
Appendix 1c

The Normalize window gives you a choice of how much louder or softer you can make your wave. Before changing (or Transforming) a wave you have to select it. Select the part you wish to change by left click/drag. It will go white. Then you can Transform it.

The Delay Effects windows give you a choice of preset effects that you can preview.
If you only select a small section of your wave to preview, it will take a lot less time to hear the effect.
When you are happy, select the whole wave and apply the effect to that.

**Before changing a wave too much it may be a good idea to save it as something else first.**
Remember that you have to save the wave before it changes in the Multitrack View.

deleting sections of waves
To make a wave fit exactly to a beat, or to start at the right spot, you may need to trim it.
This can be done in either view but the wave has to be saved once it has been altered.
Just select which part you want to delete by using **left click/drag**.
Then use **edit/delete selection**
Appendix 1c

You might find it necessary to zoom in so that you can see exactly where the sound starts or stops. The picture below shows the difference between zooming in and zooming out.

This is important and very helpful in the Multitrack View when trying to align two tracks.
Have a look at this picture. The first is zoomed out, the second is zoomed in.
Appendix 1c

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Lesson 4 - Revision Exercises

INTRODUCTION
Create a new folder in My Documents
Open Cool Edit - in Multitrack View
Save Session as ... [your choice - just make sure you save it in the folder you have just created]

Background
You are going to use Cool Edit to produce a SINGLE, MIXED DOWN piece. You will need to choose a topic and get to work quickly. Think about a musical introduction (short) and then some words. Try to make it as varied and as interesting as possible.

Don't waste too much time looking for the perfect sound

Task One
Write your script
Choose a topic
Work out what you want to say
Are you using two people?
Do they both have something to say?
WRITE IT DOWN

Task Two
Pick a group of waves that you think will be suitable (use Lesson one waves and/or lesson three waves).
Put them in your folder.
You can do that by opening each wave in the Wave View and then using save as ... and renaming them and putting them in your folder.
Or just drag them into your folder using Windows Explorer

Task Three
Record your script
Appendix 1d

If you are working with a partner one should operate the computer and the other speak.
Then swap.
Record small sections at a time or leave gaps so that you can cut the wave up (splice) if you need to.
Save the file.
If you want to add effects it may be best to save as so that you still have the original file in case anything goes wrong.
You may need to use TRANSFORM/AMPLITUDE/NORMALIZE to make your wave louder.

Task Four
Add your other wave files.
Be careful about duplicating and overlapping.
Think about adding a beat and some music.
Keep saving.
Remember that anything you do to a wave in the Multitrack View needs to be saved.

Mix Down
When you've got everything right you need to mix it down.
Remember that you can change volume settings using either the green envelope line in the Multitrack View or right clicking in the track information box.

![Multitrack View](image.png)
Appendix 1d

Remember, don't keep turning things up
Try turning down instead, or using small changes
It's probably best to mix the music (backing) tracks first, then you can get the volume right with you voice over.
Use edit/mix down/selected waves
Then save the mix down wave and edit/insert in multitrack
Remove the waves you don't need
Then mix the voice over wave with the backing track.

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Welcome to CAKEWALK PRO AUDIO 9

Introduction
Cakewalk is a midi program. It lets you play and record musical sounds from a synthesizer to a computer.
Unlike Cool Edit, where you are recording actual waves, Cakewalk uses midi to make the synth play. There are no real sounds recorded onto the computer with midi.
We are going to use synthesizers that use General Midi. That is a group of 128 sounds and 7 drum kit sounds that have been agreed to as a world standard. Any synth that has General Midi has the same sounds as any other with GM.
Cakewalk lets you record audio files as well.

Menus
Look at the menu bar. Find menus that are the same or similar to other programs.

Getting Started
Use File/Open ... and select 2-Part Invention #13 in A minor.wrk this is a .wrk file.
Work files are Cakewalk files that contain midi data and other information.
You can also use .mid (midi) files. Midi files are necessary if you want another program to play your work.
You will see this screen.
Cakewalk lets you work with different windows open.
Exercise One

Close the information box and the big time view window.

Make the track view the size you wish. The Track View is where you will do most of your work.

Press the play button (or use the spacebar) to start the piece. Double click in the Patch column to go to the Track Properties. While the piece is playing use the up and down arrow keys to change the sound. Choose a sound and click OK. It will add the patch name to that column.

Some Important Terms

Track - The whole row of musical information. All the notes played and anything that is done to them.
Appendix 1e

**Channel** - The sound (midi) source for the track. More than one track can have the same channel.

**Patch** - The actual name of a midi sound.

**Measures** - The American name for bars in music.

**Tick** - A small unit of measurement. Each quarter note (crochet or 1 beat note) can be divided into between 48 and 480 ticks. We will be using 120 ticks per beat.

**top**

**Exercise Two**

Create your own folder
Open a Cakewalk .wrk file, close the windows you don't need, set the track view size to suit and **save as ...**
Then save (as a midi 1) into your folder.
Now play with it.
Go to the **Staff View**
Either right click in the **Name** column or use **View** menu.
When you've done that try the **Piano Roll View**.
Appendix 1e

Exercise Three

Go to the **track view**. Choose a section of data.
You can do that by clicking in a section.

By choosing a track and dragging above the midi data then clicking the track number.

You can select a whole track by clicking in the track number.

You can drag your selection to another track by clicking and dragging.

You will get an options box
Click your choice and click OK
You can also use **copy and paste**.

You will get a copy options box
Make your choice and click OK.
If you are copying a section of track don't select **markers**.
You may need to select **tempo changes** and **meter/key changes** if there are any in your piece.

Then choose where you want to paste and choose **paste**.
Appendix 1e

You will get another options box, which will ask you to choose how you paste.
You need to choose exactly where you want your piece and which track you wish to paste into.

top
Lesson 6 - Composition in Cakewalk
This lesson will look at how we can create a simple piece of music that actually sounds good.
We will be making a piece that has
A bass part
Some chords
A melody
A drum track
We may be able to include a pad - held synthesizer notes that fill out a piece.

Exercise 1
Open Cakewalk
Open a New file by using file/new. You will see this:
This window lets you choose the type of new file you wish.
Click on DVPS_GM
This is a template that has been set up specially for you.

Track number one must be left empty. [If you are using the Casio or Roland - it doesn't matter with the W7]

When you click OK the following window will open:
Appendix 1g

<table>
<thead>
<tr>
<th>Name</th>
<th>Patch</th>
<th>Chan</th>
<th>Vol</th>
<th>Pen</th>
<th>Port</th>
<th>Keys</th>
<th>Source</th>
<th>Elide</th>
</tr>
</thead>
<tbody>
<tr>
<td>Leave blank</td>
<td>M S R</td>
<td>1</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>1</td>
</tr>
<tr>
<td>Bass</td>
<td>M S R</td>
<td>2</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>0</td>
</tr>
<tr>
<td>Piano</td>
<td>M S R</td>
<td>3</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>0</td>
</tr>
<tr>
<td>Vibes</td>
<td>M S R</td>
<td>4</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>0</td>
</tr>
<tr>
<td>Secondary Accompaniment</td>
<td>M S R</td>
<td>5</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>0</td>
</tr>
<tr>
<td>Secondary Melodic</td>
<td>M S R</td>
<td>6</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>0</td>
</tr>
<tr>
<td>Alternative 1</td>
<td>M S R</td>
<td>7</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>0</td>
</tr>
<tr>
<td>Alternative 2</td>
<td>M S R</td>
<td>8</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>0</td>
</tr>
<tr>
<td>Alternative 3</td>
<td>M S R</td>
<td>9</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>0</td>
</tr>
<tr>
<td>Drums &amp; Percussion</td>
<td>M S R</td>
<td>10</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>0</td>
</tr>
<tr>
<td>Standard Kit</td>
<td>M S R</td>
<td>11</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>0</td>
</tr>
<tr>
<td>Standard Kit</td>
<td>M S R</td>
<td>12</td>
<td>-</td>
<td>-</td>
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<td>0</td>
</tr>
<tr>
<td>Lead 3 (guitar lead)</td>
<td>M S R</td>
<td>13</td>
<td>-</td>
<td>-</td>
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<tr>
<td>Pad 1 [melody]</td>
<td>M S R</td>
<td>14</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>0</td>
</tr>
<tr>
<td>Pad 2 [melody]</td>
<td>M S R</td>
<td>15</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>0</td>
</tr>
<tr>
<td>Pad 3 [melody]</td>
<td>M S R</td>
<td>16</td>
<td>-</td>
<td>-</td>
<td>-</td>
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<td>-</td>
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</tr>
</tbody>
</table>

Each time you wish to record a track you need to set **track one** the same as the track you are recording.
So if you are using patch 36 in track 2 you need to set track one to patch 36 as well.
Or, if it says **fretless bass** in track 2, you need to set track 1 to **fretless bass** and so on.

**When recording drums:**

Casio - CTK-601
Track one - set to track 10 set to patch number 160
Roland - EM-10
Track one - Press the **DRUMS** button on the instrument until it reads **Standard**.
Yamaha - W7
No special requirement - just the channel button on the instrument the same as the channel number in Cakewalk.

**The Metronome**

This tool bar shows the metronome.

A metronome is an instrument used for keeping time.

In Cakewalk, the metronome clicks away when you are recording. This is good so long as you can play in time.
You can turn the metronome off but Cakewalk will still record in strict time.
So you need to be aware of **tempo** and time.
Appendix 1g

Tempo
Tempo is really just the speed of a piece. We will using 4 beats in a bar - so it’s just how fast those beats go. It is measured in beats per minute. 60 beats per minute (bpm) is one beat every second.

You can set a tempo without knowing how many bpm it is by using the insert tempo button

Just click it and then click your new tempo here:

Your First Song
In this piece we will only be using the black notes of the piano keyboard. Together they form what is called a pentatonic scale. These scales are great because all of the notes sound good together.
1. Set a tempo
2. Choose track 2 fretless bass
3. Using only 2 black notes - down low on the keyboard - experiment with some patterns.
Try to keep it simple. Set up a repeating pattern. Play it a few times until you sort of know it.
4. Arm track 2 - press the R button in the track view in track 2.
5. Press the record button. You will here the metronome click. Count four or eight beats and start playing your pattern.
6. Press stop (or space bar). You will see what you have recorded.
7. SAVE YOUR WORK We will use .mid (format 1)
8. Press play (or space bar) and listen to what you have done.
9. Set up another track - piano or melody - and try to add some tune or chords.
Chords are more than one note played at the same time. Always only use the black notes.
10. Keep going with other tracks. You can copy and paste to make your recording longer.
Don't forget to save and save and save.
top
Appendix 1g

Lesson 7 Composition Project

**Introduction**
For the last 4 weeks of the project we will be working with both Cakewalk and Cool Edit.

It will be your task to create a piece that has:
some midi input - (you play it on the keyboards or find a midi file and change it to suit)
wave files that you have found or created
your own voice that has been recorded.
You will need to record your midi files from Cakewalk into Cool Edit and then mix down the whole thing.

Cakewalk Revision
All the information you need for using Cakewalk is here in lesson_6.htm.
Revision Exercise
First we need to create a simple Cakewalk piece.
Open Cakewalk

Go **File/Open ...**

Double click or open **Drum Styles**
Choose one of the **Hip Hop** styles and **open**. That will give you a new page with just the drums in Track 10.

Select the track by clicking on the track number then copy it.

Now open a new file. Use **File/New...DVPS_GM**
Select track 10 by clicking on it and **paste** into it.

You now have a really cool drum track - add your own music.
Keep it simple.

**Saving Midi Files**
It is important to save your work correctly.
When using Cakewalk you can save in many different formats.
If you use **normal** you will save your work as a Cakewalk file. That means that you can't play it as a midi file using another program.
We need to be able to do that so you need to save your work as a **.mid** file.
Appendix 1g

Cakewalk lets you choose a number of types of midi file. We will use **MIDI Format 1**.

Mixing Midi Files
Before recording your midi file into Cool Edit it is a good idea to set all the volume levels so that it sounds good.
Click on the console view button

This will take you to the mixing console.
Here you can set volume levels and pan settings. Of course you can also do this in the track view.
Appendix 1g

Setting Up For Recording

Before you can record from your synthesizer, you must plug it into your computer.

Run a lead from the **output** socket of the synth to the **line in** socket at the back of the computer.

(I've already done it)

Open the volume control window on the tool bar and choose **properties**

Choose **recording** and click **OK**
Recording Into Cool Edit
If you are completely happy with your piece you can record the whole thing straight into Cool Edit.
You may wish to record bits of it.
Sometimes it is good to record the drum track separately so that you can cut it up if needed.
Open Cakewalk and Cool Edit. They will appear on the tool bar.

All you need to do is click on either program in the tool bar to switch between them.
Appendix 1g

Cakewalk
Before you record either solo the track you want to record
or mute all the other tracks in Cakewalk.
Make sure that you are at the start of the piece.

Open Cool Edit using the tool bar and choose at track to record into. You are in the Multitrack View

Cool Edit
Click on the r button to arm the track and the record button in the transport.
The program will start to record.
Quickly click on Cakewalk in the tool bar and press play
If you set it up right it should record.
Just press stop when you've finished.

Your Project

You will need to record and mix your own piece - more details here

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Appendix 1g

Think about what it will be.
Information - with music - about yourself or something interesting
A story set to music - either one you've written or one you know
A song you write
A radio advert for a product or event
A piece which tells its own story - a storm, a fire, a space trip etc
A poem
Anything you like that you can include voice and musical sounds
You need to write out some ideas and details in your work books and show me.
You only have four sessions left - including today. Make your choice and stay with it.

Working Alone or Together
It will be much easier to work together because there are only four keyboards.
If you feel you need to work on your own, you can. BUT you will have to share a keyboard for your midi work. That means files will need to be saved and transferred and you will have to be very well organised so that you don't hog a keyboard.
Think about it carefully before you choose.
Appendix 2a

FACULTY OF EDUCATION/DEPARTMENT OF SCIENCE AND MATHEMATICS EDUCATION

Plain Language Statement

PROJECT TITLE: PRIMARY SCHOOL CREATIVITY AND COMPOSITION IN A PROFESSIONAL LEVEL MUSIC SOFTWARE ENVIRONMENT

Name of participant:

Principal Investigator (supervisor): Dr. Anne McDougall, Associate Professor of Computer Education

Name of investigator: NICHOLAS REYNOLDS

Ph. 8344 8534, nreyn@unimelb.edu.au

Dear ____________,

Thank you for your expression of interest in my research project. This letter sets out in plain language the nature of my research, my obligations as a researcher and the level of commitment expected of your child. I hope that it explains everything clearly. Please feel free to contact me at school or home if you need more information.

This study is designed to investigate the effective use of professional level music computer software in a primary school setting. It is hoped that children will be able to use this software to assist them in composing music, putting together soundtracks for projects and many other creative uses.

The study is not intended to find out which children are best at this type of activity, rather to see if children can use the software and how it can best be used in the creative process.

The study will be conducted along the lines of a normal class. It will be held during class time, which means that participants will have to miss their normal scheduled class. Sessions will occur weekly and will take between 45 minutes and one hour. The study will run during term two, it is possible that some additional sessions will need to take place during term three.

Participants have been selected from grades 3 - 6. Selection has been made after consultation with your child's classroom teacher and the Principal, Peter Donaldson. It is felt that your child will not be disadvantaged by missing some normal class time.

It will be necessary to maintain records about your child and to collect data about the way all of the participants work with the software. I will be making audio recordings of all sessions. This will allow me to make detailed notes on everything that occurs. Transcriptions of audio recordings pertinent to your child will be made available to
Appendix 2a

you upon request. I will take some photographs of the sessions. This will assist me in
describing the setting and in recording student interactions. I intend to make some
video recordings, again to describe the setting and, in particular, to record the final
presentations. I will be required to detail what the participants already know about the
subject and to assess what they and I feel they have learnt or are learning. This is very
much the way teachers carry out their normal teaching practice. I will also be making
CD copies of each child's work after each session. At the end of the study I will make
CDs of each finished product. As well as copies for my research, each participant will
receive their own copy.

The data collected during this study will form the basis of my thesis for the Master of
Information Technology in Education degree. It is hoped that I will be in a position to
publish my research in appropriate journals and to present it at appropriate
conferences. This research may also form the basis of further study.

It is of great importance to the University, to the Department of Education, to the
school and to me that participants in research are protected. Confidentiality is of
utmost importance. Your child will be referred to only by their first name, or by a
pseudonym. No personal details will be published and no information regarding your
child will be made public without your written permission. Bearing this in mind it is
worth noting that in such a small setting complete confidentiality is not possible within
the Don Valley community. Since the nature of this research is not of a personal or
sensitive nature, this is not of concern.

Photographs, of course, cannot be anonymous. All captions to photographs will
contain first name or pseudonym only. Children's work will remain the property of the
child. I will, however, need to use it in my publication.

As with normal class interaction, confidentiality is governed by legislation. While I
can guarantee confidentiality under normal circumstances, where legislation mandates
(mandatory reporting) I am obliged to breach confidentiality.

It is worth noting that participation is voluntary and your child is free to drop out of
this study at any time and to withdraw any unprocessed data. Participation or
nonparticipation has no bearing on your child's schooling or results.

Data will be stored according to University policy. My computer files will be password
protected. It is not intended that my research records or files will be destroyed.

I hope that this letter is not too daunting. Please bear in mind that all research
conducted in conjunction with the University of Melbourne, no matter how innocuous,
is subject to rigorous ethical standards. I am obliged to give you much of the
information contained in this letter. If you have any concerns or queries please contact
me or the Executive Officer, Human Research Ethics, The University of Melbourne,
ph: 8344 7507; fax 9347 6739.

Thank you again for your support, I am sure that the experience will be of great benefit
to your child and should be highly enjoyable and productive.

Yours sincerely,

Nick Reynolds

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Appendix 2b

Name of participant: 

Principal Investigator (supervisor): Dr. Anne McDougall, Associate Professor of Computer Education

Name of investigator: NICHOLAS REYNOLDS
Ph. 8344 8534, nreyn@unimelb.edu.au

Dear ___________,

Thank you for showing an interest in being in my project.

There are two reasons I am doing this project, firstly it is part of a university course called, Master of Information Technology in Education. Secondly and more importantly, I think primary school children are capable of using very advanced music software to help them create their own music. This project will help me show that this is so.

Your part in the project will be to come to a special class each week to work with this software and create music on the computer. There will only be eight children in the class so you will have plenty of my time and very few interruptions. The class will be held during school time so you will have to miss out on some normal school work. I hope that will be okay with you.

You will not be tested or expected to write the greatest piece of music ever written. I don’t even know whether you can play an instrument or not – that doesn’t matter.

There will be a tape recorder operating all the time so that I can write out what people are doing and saying. That is an important part of the work that I have to hand in. There will also be a video camera operating from time to time. I will be saving all your work and keeping copies of it. When I write about the project, or talk about it, I will only use your first name. The University is very strict about not using children’s full names. I will probably take some photos as well, which I may use when presenting my work. Any music you write may be used by me but will always belong to you.

At the end of the project I will give you a copy of your work and we will hear each other’s work. We may even show the rest of your class.

I am very pleased that you have agreed to be involved but if you want to stop doing this project for any reason, you can. That is absolutely okay with me – and the University.

Your parents have a very detailed description of the project and I am happy to discuss it with you at any time.
Appendix 2b

I am sure that you will get a lot out of this project and that it will be very worthwhile.

Nick Reynolds
## Track List for Attachment 1 – Audio Compact Disc

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<th>Title</th>
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