Contributions of an Enriched Musical Program as Taught to Students in a Primary School Classroom

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Abstract

This study re-affirms the importance of music within the broader society and the primary curriculum. However it notes that due to differences in philosophy there is a division in the approach to teaching music by teachers. The 'instrumentalists' emphasise the importance of teaching skills of music making and tend to create special opportunities for the musically skilled students through ensemble groups, choirs and bands. In contrast, other music teachers promote a generalist approach that includes a broad range of skills, concepts and appreciation rather than focusing on the precise skills involved in learning a particular instrument.

This study involved a quasi-experimental design in which the effects of two musical programs as taught to two year-five classes were compared. The control class (24 students) received a 30-minute weekly general music class with a specialist teacher. The experimental class (24 students) undertook this same weekly program and in addition received a recorder program by the classroom teacher for 15-minutes, four times per week. At the beginning of the program the two classes were not found to be different in gender division, age, musical skills, family musical influence and cognitive and creative abilities. At the end of the 11 week period the students in both classes were re-tested for musical skills and creativity (measured by the Torrance Test of creative Thinking).

The results showed that at the end of the 11 weeks students in the experimental class, learning the recorder, were more advanced in a range of musical skills and knowledge as compared to the control class. A backward, stepwise, multiple regression analysis revealed that factors contributing to this development included the students' cognitive ability, private after class musical tuition, family musical influence and participation in the classroom recorder program.
The results also indicated that at the end of the 11 weeks, students in the experimental class learning the recorder had increased levels of creativity when compared with the control class whose members did not learn the recorder. The additional recorder program may have contributed to the development of creativity in the experimental class. These results are by no means conclusive because the researcher was not able to control all potential influences of creative development. However these results are consistent with research investigating similar connections between music and general creative development dating back three decades.

This study argues that the additional recorder program was responsible for the enhanced musical skills of the students in the experimental class and that the potential exists for a program similar to the recorder program to contribute to the enhancement of creative abilities. The study recommends that primary school musical programs should include classes where generalist musical skills and concepts are taught together with classes that are enriched by the involvement of particular instrumental skills where students learn real musical skills and learn to make music. That is, weekly generic music programs covering many musical attributes are not enough to provide students with a truly holistic enriched program. Limitations of the study are acknowledged and recommendations for further study are made.

Chapter 1

Introduction to the Study

Background

Music plays an important role in the lives of individuals (see Chapter 2). It is a powerful medium that has the potential to influence many attributes of the human psyche including mood, memory, concentration, attitude, self-esteem, self-confidence and cooperation. As a result music has an impact on the quality of human life. Music-making is a pleasurable, creative, physical, mental and social activity which has been associated with the earliest of human existence. It is present in all cultures and is an important component of personal and cultural identity.

The fact that music is an important element in human life is recognised by the curriculum and music features in the New South Wales (NSW) K-6 Creative Arts Syllabus (Board of Studies, 2000). All primary schools are required to provide students with a musical program in accordance with syllabus guidelines, however, musical programs differ from school to school. Chapter Two will present evidence of a philosophical division in the approaches to music education. Extrinsic music education philosophy promotes music education for generalised benefits including those of a social, physical and intellectual nature. Intrinsic music education philosophy encourages the inherit value of an aesthetic kind as gained through sustained learning as occurs with a particular instrument (Temmerman, 2003). The extrinsic music educational philosophy dominates state syllabi and therefore the rationale for music education in many schools (ibid). This philosophic divide is compounded in schools where music is often only provided with a token 30-minute class per week (Stevens, 2003) in which the main focus is on general music appreciation that covers a wide variety of topics such as composing, singing, listening, moving and playing (Yourn, 1999). Most schools also face problems concerning funding, equipment and staffing arrangements that limit their

ability to deliver a rounded musical education (Russell-Bowie, 2003; Stevens, 2003). Chapter Two will also note that there has been a call to unify these philosophic views in order to create a more balanced and holistic approach to music education (Temmerman, 2003; Yourn, 1999).

This study addressed the nature of delivery of music instruction in this setting. It compared the respective benefits of two musical programs as taught to two year five classes. The first program involved one 30-minute weekly class with a specialist music teacher. The second program involved the 30-minute weekly lesson and additionally the second program also included four 15-minute sessions per week in which students were taught the recorder by the regular classroom teacher. The control class received only the regular 30-minute class with the specialist teacher per week, while the experimental class received both the regular class and the addition of four 15-minute recorder sessions.

Aims of the Study

The purpose of this study was to compare the respective learning benefit of two musical programs as taught to two year-five classes. In relation to the additional recorder program the research attempted to answer the following questions:

1. Did the additional recorder program have an impact on the musical knowledge and skills of the students in the experimental class as compared to their counterparts in the control class?
2. If so, what factors may have contributed to the students' development of musical knowledge and skills as measured by a specifically created test of musical ability?
3. What theoretical and technical skills and understandings, in relation to music, did the students in the experimental class learn or develop from the special recorder sessions?

4. Did the recorder program influence measures of the students' general creativity?

Significance of the Study

Music brings direct social, emotional, personal, physical and mental benefits an individual thereby improving the quality of an individual's life. This study addresses the delivery of music education in an environment in which the musical instruction provided is generally less than satisfactory in many schools (Russell-Bowie, 2000). The study provides data and draws conclusions that lead to recommendations in relation to a more effective delivery process for music education in primary schools.

Limitations

This was a small study involving two musical programs as taught to two classes in a single primary school. It was of quasi-experimental design because the researcher did not have control over the students assigned to the two class groups nor did she control the nature of the two musical programs being taught. The researcher was merely invited to observe the recorder program by the classroom teacher who also assisted in gaining permission for the study from school administrators and the schools governing bodies.

Definition of Terms

- Generalist Music Appreciation Program – Music class which focuses on broad skills, concepts, understandings and appreciation of music.
- Instrumental or Performance-based Music Program – Skills-based music teaching focused on the instruction involving a particular instrument.
- Extrinsic Music Education Philosophy – The focus of music teaching to achieve general, often non-musical results.

- Intrinsic Music Education Philosophy – The teaching of music for the value of music itself (aesthetic education). Usually involving sustained skill development with a particular instrument.
- Specialist music teacher – A specifically trained teacher of music.
- General classroom teacher – The regular classroom teacher responsible for one pre-dominant class group.
- Experimental Class – The class which undertook the recorder program for 15-minutes four times per week in addition to the regular 30-minute program with the specialist music teacher.
- Control Class – The class which undertook the regular school music program for 30-minutes per week with the specialist music teacher
- Variable – A symbolic representation of an empirical property that can take two or more prescribed values (Frankfort-Nichmias & Nachmias, 1996).
- Path analysis – The process by which backward, stepwise, multiple regression analysis is employed to weight the dependencies of causal models.
- Exogenous variable – The background variables whose variance is determined by factors external to the causal model.
- Endogenous Variable – Variables whose variance is partly determined by exogenous variables included in the causal model and partly by factors which are external to the model. These variables often mediate between exogenous variables and the ultimate dependent variable.

Scope of Succeeding Chapters

Chapter two examines recent literature concerned with the importance and effects of music in the lives of individuals, the place of music in education and a discussion of the recorder and its use in Australian schools. Chapter three outlines the methodology employed in the study, re-states the research questions and outlines statistical operations to be used in the

analysis of data. Chapter four describes the students of the two classes, argues for the initial equivalence of the two classes and presents the analysis of the data gathered from the pre and post testing of the students in the two classes. Results of this data analysis are clearly represented through exploratory path diagrams. Chapter five responds to the research questions, provides a more complete discussion of limitations and discusses the results before making a final recommendation in relation to music education.

Chapter 2

Literature Review

Introduction

This chapter argues that music plays an important role in the life of the individual, in social interactions and in society in general. As a result, music has an important place in the education of children. This chapter examines the role of music in the curriculum and the way music is generally taught in NSW primary schools. The chapter points to a potential division among music educators over the respective role of instrumental teaching versus generalist music teaching. The chapter argues that this study is important because it provides data that informs this debate.

Defining music

The Nature of Music

Music is the art and science of ordering tones and/or sounds in combination or succession into a temporal relationship with each other in order to achieve a composition having unity and continuity (Merriam-Webster, 2004). Music can involve both the human voice and an array of instruments as diverse as the human imagination. However all forms of music and the art of music production have one thing in common – they are valued by all human cultures (Encyclopaedia Britannica Online, 2004).

Since music can communicate emotion as well as ideas it has been defined by musicians as "an art, a discipline, a language and a vehicle of instruction" (Kelstrom, 1998, p.39) and is considered to be important in an individual's physical, social, mental and personal development. Jensen (2000) argues that music is able to "kindle the human spirit, sharpen the mind, fuel the

body and fill the heart" (preface). Music is valued in society and is present at many significant social events in society such as at weddings, funerals, civic ceremonies, bar-mitzvahs, parties, dances, church services, political rallies and even football matches (Hargraves & North, 1999).

Technology has revolutionised music in modern society and has provided individuals with unlimited access to it (Hargraves & North, 1999). Examples of these technical changes include music on the internet, discman and the Musical Instrument Digital Interface (MIDI) (Hargraves & North, 1999). These developments have made music an "essential accompaniment to many aspects of everyday life" (Hargraves & North, 1999, p.72). These technologies can change the nature of music education.

The Importance of Music

Music and Cultural Identity

Music provides many social contributions and supports the development of a healthy culture. It is a global behaviour that has been associated with the earliest human existence (Kelly, 2002). For example Jensen (2000) reports that early cave paintings depict the use of music and the Bible contains references to instruments and music in the early chapters of Genesis (for example, Gen 4:21). Music education plays an important role in transmitting cultural values, skills and traditions and is constantly re-created to reflect cultural constructs, values and functions (Kelly, 2002). Music may be the most uniting factor shared throughout the world as it seems to be able to increase harmony and social bonding among those playing or listening to it (Jensen, 2000; Kelly, 2002). In this way music impacts on "aesthetic, attentional, cognitive, emotional and motor capacity processes" (Jensen, 2000, p.3).

The content of music education courses highlight the aspects of music that each culture considers to be important for individuals and can express how they feel and think about their experiences in life (Kelly, 2002). Music teachers in schools or those conducting private musical tuition transmit musical culture to members of society and in this way act as a strong socialising agent (Constantura, 2001; Kelly, 2002). Within the one culture music can create cultural identify and heritage which can be passed on from one generation to the next, thereby creating strong and cohesive communities (Hargraves & North, 1999; Jensen, 2000). Music is able to assist culture through the promotion of social skills and associated activities, such as dance, and in this way it can enhance awareness of others and tolerance for differences. Jensen (2000) argued that music can break down barriers between "races, religions, cultures, geographic distinctions and socio-economic strata" (p.6). In his view, music can define, support and transmit a particular set of cultural values. Therefore music assists in creating unity and harmony through acting as a vehicle for free expression and cultural identity (Jensen, 2000).

The social functions of music appear to be more pronounced in non-western cultures and, for example, because of its mix of cultures, Australia does not have a strong cohesive musical background as compared with most other countries which tend to be mono-cultural (Russell-Bowie, 2003). In contrast, the traditional Australian indigenous people have a rich culture of music and music is viewed as a "natural part of growing up and learning one's place in an aboriginal community" (Russell-Bowie, 2003). As such, music making in traditional Aboriginal society is an integral part of culture. It articulates individual and community identity, time and place (Dyer, 1998). It is also used to transmit or encode survival knowledge for example through songlines performed in corroboree (Chatwin, 1988). Further, survey results have indicated that Australians from non-English speaking backgrounds have a more positive view of the arts as compared with Australians of Anglo origin (Nexus, 2001). The Anglo population in

Australia has limited cultural participation in the arts and, for them, music is usually viewed as a spectator sport (ibid). Despite this, the singing of 'Waltzing Matilda' at an International Rugby Union match can have an electrifying effect on the crowd and the team players. Even in Australia music has a fundamental place in culture and continues to emphasise its ultimate importance.

Physiological and Emotional Effects of Music

Music can have an affect on many attributes of an individual's physiological responses within systems of the body. For example music has been found to impact upon human blood pressure and to influence blood flow to specific parts of the brain implying specific brain activation (Jensen, 2000). Jensen (2000) argues that blood flow is associated with memory, stress and the immune system and he suggests that it is logical that these physiological processes could well be affected by music. The ability of music to alleviate pain in medical patients is commonly publicised and well researched (Hargraves & North, 1998). Therapists have found that music therefore enhances mood and increases survival rate for ill patients (Wigram & DeBacker, 1999).

Music has also been linked to mood and states of emotion (Hargraves & North, 1999; Kenny & Faunce, 2004) and choice of music and the manner of its production can reflect and affect the mood of individuals. For example consonant music encourages positive emotions however dissonant music is associated with negative, unpleasant emotions (Blood, Zatorre, Bermudez & Evans, 1999). It is also noted that people who are in a state of unpleasant high arousal prefer relaxing, quiet music compared with those, who, in a state of pleasant high arousal, prefer stimulating, loud music (Hargraves & North, 1999, p.77). A study on the effects of group singing found that patients who participated in a musical singing program showed significant

improvements on mood, coping strategies and perception of pain (Kenny & Faunce, 2004). Listening to music can relax the body and, even a short half-hour session of active singing or listening to singing, has been found to result in immediate improvements in mood (Pelletier, 2004; Unwin, Kenny & Davis, 2002). Society takes advantage of the connection between music and emotional state and attempts to use music to influence consumer behaviour for example in television advertisements, shops and restaurants (DeNora, 2000; Hargraves & North, 1998). Teachers often integrate music in the general classroom life in order to relax and calm students and create a positive classroom tone (McGovern, 2000).

Music and Development in Children

Educational and scientific research undertaken using recent imaging techniques to monitor the electrical activity of the brain's of young children found that those children who received musical instruction at an early age developed more neural pathways in the brain (Flohr, Miller & DeBeus, 2000). The brain has critical periods where it is sensitive to active development and it is suggested that the ages five to nine years old are a good time to begin music lessons (Jensen, 2000). This suggestion is supported by studies of cortical activities in adults which have found that those subjects who played an instrument before the age of nine had greater cortical activity when listening to music, in comparison to those who did not play an instrument (Pantev, Oostenveld, Engelien, Ross, Roberts & Hooke, 1998). By establishing more neural pathways in the brain and therefore strengthening synapses between brain cells researchers suggest that making music can directly influence cognitive abilities (Strickland, 2001/2; Leher, 1998; Weinberger, 1998a). It is argued that music education facilitates students' intellectual development because as it rewires the brain it helps in all areas of thinking and other subject areas (Leher, 1998; Weinberger, 1998a). For example, musical training has also been found to be associated with increased memory capacity and recall, particularly in relation to verbal

memory (Chan, Ho & Cheung, 1998). In addition, music has the ability to cue the recall of nostalgic moments of prior experience and in so doing can make the past 'come alive' for the individual (DeNora, 2000).

Instrumental instruction plays a particularly important role in the physical development of an individuals. For example, fine motor skills are learned as a student attempts to play an instrument and correct breathing techniques are emphasised particularly in the playing of wind instruments (Hoffer, 2001). These fine motor skills can transfer to other areas including key board skills and general tool use. In addition coordination and posture are important beneficial aspects of instrumental instruction (Hoffer, 2001). Each of these factors are important for physical well-being.

Winner and Cooper (2000) suggest that music nurtures discipline through consistent practice and performance and that perseverance can be developed when students work on a long-term project. Public performances assist in the development of self-esteem, poise, self-confidence and cooperation (Costa-Giomi, 1999; Cope, 1998; Nexus, 2001; Winner & Cooper, 2000). Additionally personal characteristics such as motivation, personality, level of commitment, goal orientation and self efficacy are as important in the development of an intrinsic desire to continue to learn an instrument as they are in other branches of learning (Pitts, Davisdon, McPherson, 2000). Music instruction therefore aids in helping school students display positive attitudes, participation, effort and attention towards school (Winner & Cooper, 2000). The development of general musical skills can also help students whole learning experience as they develop literacy skills, self-esteem, confidence and enjoyment (Russell-Bowie, 2000; Sanders & Browne, 1998).

Nearly all of the functions of music in human life are social (Hargraves & North, 1998) and therefore there are many social advantages of sharing musical skills with other individuals or groups (Kelly, 2002). Social benefits of music to children include developing new friendships and participating in cooperative music making activities (Kelly, 2002). Winner and Cooper (2000) discuss collaborative music activities at school and mention that students who participate as a member of a group feel far less alienated. Overy (1998) studied the effects of increased musical instruction of school children aged 7-15 and found that the experimental group which received music instruction on a daily rather than weekly basis showed improvement in both academic and social skills.

Music as an Intelligence

In addition to the aesthetic appeal of music, musical behaviour can be viewed as a distinct or autonomous type of intelligence or 'way of knowing' (Murphy, 1999). Gardiner's theory of multiple intelligence divides intelligence into eight major ability groupings that includes music as a distinct domain of knowledge and human ability (Gardiner, 1993, 1998; Rauscher, 1999). Thus musical talent is considered by some researchers to be able to be recognised and kindled, therefore having the potential to be revealed and nurtured in the school classroom (Haroutounian, 2002).

Although music is identified as an separate intelligence, Cope (1998) recognises that musical skills such as the learning of a musical instrument actually require attributes and skills from other intelligence areas. For example kinesthetic attributes such as good timing and coordination are important for holding and playing the instrument. Intrapersonal attributes including persistence, motivation, self-direction and the ability to monitor one's own performance are

important for developing musical skills. Interpersonal skills used, such as cooperative strategies and the ability to 'read' and anticipate the responses of others, are important when learning to play with other musicians. Finally, visual/spatial abilities help individuals comprehend relationships within a piece of music (Cope, 1998). Musical training may help develop these aspects of other intelligences and have a positive impact on the development of general cognitive abilities (Kay, 2000).

Music and Creativity

Since the relationship between creativity and music is an important part of this study this section will provide view of creativity and music's involvement with it.

Defining Creativity

Some scholars believe that everyone is born with the ability to think, act and live creatively and that it is possible to encourage or inhibit the development and expression of creativity (Hickey & Webster, 2001; Sharp, 2001). There has been considerable interest and debate over the actual definition of creativity and it is considered to have many possible meanings (Weinberger, 1998a; Sharp, 2001; Hickey & Webster, 2001). Creativity can be viewed as being the development of new, valuable, original and fresh ideas as well as being associated with self-actualisation and the involvement of choice, imagination and problem solving (Craft, 2000). Creativity is not the same as intelligence or talent and students who perform well on intelligence tests or have a high level of aptitude and skill in a particular area are not necessarily highly creative (Sharp, 2001). Perkins (1999) suggests that teachers can help students develop creative thinking attributes by firstly enabling them to construct their own knowledge which they can then use in a creative or divergent manner.

Although there is a large body of literature describing general creativity, surprisingly, only a small proportion of research actually focuses on general creativity and the arts. Research on creativity and music predominated in the early 1970s (Hickey, 2002). Studies tried to assess the ability of music to enhance creativity and have concluded that there appears to be a relationship between musical experience or musical studies and scores of general creative potential (Hamann, Bourassa & Alderman, 1991, 1990; Kalmar, 1982; Leibowitz, 1978; Silverman, 1962; Simpson, 1969; Torratus, 1964; Wolff, 1979). Interest in this area decreased over time but is currently undergoing a mild resurgence and many scholars feel that music educators need to encourage students to engage in music in creative ways and that this should be at the core of philosophy and practice (Hickey & Webster, 2001). Most research connecting music and creativity is usually focused on improvisation and composition (Weinberger, 1998a). The connection between music and creativity is considered to be supported by the "worldwide use of music across all cultures to alter mind states" (Jensen, 2000, p.42). The study of creativity remains a relatively young field and rich research is needed to deepen understanding about the connection between creativity and the arts (Hickey, 2002).

Despite this, some researchers suggest that music may enhance creativity in general rather than just in the area of music (Sharp, 2001; Weinberger, 1998a). It has been suggested that up to half of the aspects of creativity may be domain-specific (Plucker, 1999). Although theories of how to enhance creative thinking and how music education affects the development of general creativity exist, it is not yet proven and there is a need for more objective, controlled and high-quality research (Sharp, 2001; Weinberger, 1998a).

This study will address the question of the influence music education may have on the development of general creativity.

Measurement of Creativity

Just as there is no precise definition of creativity, universal agreement has not been reached concerning the best way to measure creativity. There are many different ways which creativity or creative attributes can be measured. During the 1950s researchers such as Guilford and Torrance investigated creativity through 'divergent thinking' rather than intelligence tests (Craft, 2000, p.6). This psychometric approach generated research which attempted to test and measure creativity, to identify its characteristics and to examine specific teaching approaches which foster these characteristics (Craft, 2000). These divergent thinking tests attempt to measure creativity objectively (Weinberger, 1998a).

The Torrance Tests of Creative Thinking (Torrance, 1999) is one such divergent thinking test which has been successfully applied in many settings and since it will be used in this study it will be described here. This test is the most widely used standardised measures of creative thinking ability and is supported by more evidence and regarded as being more valid than any other test of creativity (Hickey, 2002). It is available in verbal and figural versions and is appropriate for use with young children as well as adults (Sharp, 2001). Each version requires the subjects to guess causes, consequences or provide ideas for solutions to problems or product improvement (Hickey, 2002). General creativity traits are measured and the test is scored for both the quality and quantity of creative achievement in outcome variables (Plucker & Runco, 1998). These variables are fluency, flexibility, originality and elaboration. Fluency is determined by quality, flexibility, originality and elaboration. While flexibility is determined by the number of different categories discussed. Originality is measured by the uniqueness of responses and elaboration is scored by the details of the ideas provided in each response (Hickey, 2002; Craft, 2001; Kiehn, 2003). This test has been used in recent studies to measure

the connection between music and creativity (Kiehn, 2003). In this study a significant relationship was found between musical creativity and figural creativity as measured by the Torrance Test (ibid). While divergent thinking tests have come under considerable criticism from some scholars, many others feel that the Torrance tests are still valid measures (Plucker & Runco, 1998, p.36).

The Recorder

Because the recorder was the instrument of choice for this study, this section will provide a brief history of the recorder and outline its use in schools.

Recorder in the Primary School

The recorder is a popular instrument for teaching instrumental skills to primary school students. It is not an easy instrument to play well and requires motor coordination, breath control and attention to tuning (Ferris, 1998). A large range of recorder method books are also currently available and many come with accompanying compact discs. The recorder is therefore popular particularly among teachers who lack confidence in singing and still want to introduce students to the skills of a musician (Ferris, 1998). The recorder is also praised for being a "more successful tool for the teaching of musical literacy than the traditional vocal methods" (Ferris, 1998, p.70).

Nature of Instrument

The recorder is a woodwind instrument which is a member of the duct flute family (Grove's Dictionaries of Music, 1984). The modern recorder generally consists of three parts and is available in a variety of sizes to cover the different vocal ranges. This instrument was

traditionally "a solo or chamber instrument with a folk tradition particularly in dance music" (Ferris, 1998, p.68). The success of its use in England during the 1960s in the teaching of melody and rhythm saw the introduction of the recorder in many Australian school music classes (Ferris, 1998). The recorder was traditionally made from wood or ivory however they are now commonly produced using plastic particularly for use in schools (Grove's Dictionaries of Music, 1984).

The recorder had many advantages over the fife or drum which had been traditionally used in schools. These advantages included the range of recorders available, descant to bass, its ability to be tuned, the full range of chromatic notes available and its ability to assist students in learning music notation and sight reading (Ferris, 1998). The increased popularity was also due to its relative ease to learn and inexpensive nature (Ferris, 1998).

The recorder is currently played by approximately 10% of the Australian population aged 5-17 years (Nexus, 2001). It is also commonly learnt at school and identified as the second highest lapsed instrument after the piano (Nexus, 2001). The recorder teaches skills such as correct posture, finger movement, note reading and requires the coordination of the hands, mouth and throat (Leher, 1998). It is viewed as a good instrument to learn in preparation for a band or orchestral instrument (Leher, 1998). Learning to make music is an intensive exercise which requires reading the score which uses complex symbols, performing, evaluating the performance and correcting any areas which require further practice (Weinberger, 1998b). Learning the recorder as part of an ensemble requires particular brain concentration because individuals are required to play and listen to their own performance as well as coordinate with others around them (Weinberger, 1998b).

Studies have revealed that the major predictors of student success with playing an instrument are commitment and practice (McPherson, 2001/2). Students bring to music instruction expectations and values that shape and influence their musical development (McPherson, 2001/2). Teachers need to help students take responsibility for their own learning and inspire and engage the students to develop a general interest, enjoyment, satisfaction and commitment to the instrument (Pitts, Davidson & McPherson, 2000).

Music and Education

Parents, Family and Music Education

The home environment and in particular parental involvement in music plays an important role in the students' own outlook towards music (Creech & Hallam, 2003). There are a number of factors associated with the home musical influence. These include parental support and encouragement, the musical background of the parents, the playing and listening to music in the home environment and the encouragement of private music tuition (Weerts, 2002). Students bring these values and understandings to their own music education and this in turn shapes and influences their subsequent development (McPherson, 2000/1).

Music in Australian Schools

Many Australians view schools and school teachers as the essential vehicle by which individuals are exposed to music (Nexus, 2001). Educational authorities acknowledge that music is an important activity for aesthetic, intellectual, emotional and physical development (Chadwick, 2000). It can be considered to be the subject within a school curriculum that most effectively connects students to society overall (Kelly, 2002) and is one of the few subjects to link cultural life to leisure, emotion and imagination (Pitts, 2000). Music education allows students to "take

pleasure and delight in learning for its own sake" (Plummeridge, 1999, p.116). It has the ability to open minds through immersion into the various domains of knowledge and understanding (Plummeridge, 1999). Music is a powerful and necessary element in every society which suggests that musical understanding belongs to everyone (Paynter, 2002).

It is for these reasons that music is considered an essential component of the academic curriculum (Kelly; 2002; Leher, 1998; Plummeridge, 1999; Weinberger, 1998a) and is incorporated with other creative areas and listed in the Adelaide Declaration (1999) as one the key learning areas which students need to develop knowledge, skills and understanding in to have a comprehensive and balanced curriculum. However schools in Australia view the Creative Arts as one key learning area rather than as four separate and distinct subject areas including dance, visual art, drama and music. Some schools have very meaningful and valuable Creative Arts programs while others spend minimal time, fail to develop expertise and to commit resources to this key learning area (Russell-Bowie, 2000).

Curriculum development in music education has been influenced by two main philosophical arguments: intrinsic music education philosophy and extrinsic music education philosophy (Temmerman, 2003). The intrinsic or aesthetic view of music education is concerned with the inherit value of music itself. Music is believed to offer important and unique kinds of learning (Demorest & Morrison, 2000; Flohr, Miller & DeBus, 2000; Winner & Cooper, 2000). The intrinsic music education philosophy is associated with sustained learning with a favoured instrument (Temmerman, 2003). Extrinsic music education philosophy promotes broad social, intellectual, physical, moral and cultural goals (Temmerman, 2003). Syllabus documents dating back to the 1980s indicate that music education in Australian Primary Schools has a mainly extrinsic orientation (Temmerman, 2003).

One of the key questions for this study revolves around two types of delivery for music education - the provision of general musical classes emphasising musical appreciation or performance based programs that enhance those skills involved in instrumental music. These approaches flow from the two philosophic schools of thought. General music appreciation classes and instrumental music classes travel on different paths in the education of students. Classroom music educators teaching general music appreciation cater for a large number of students from a variety of musical backgrounds and focus on areas such as composition, listening, appraising and some performance (Yourn, 1999). Instrumental teaching largely focuses on practical and specific skill development rather than general broad components of music. Learning an instrument requires the sustained development of technical skills that is specific to the instrument and declarative knowledge which provides the individual with understanding (Cope, 1998; Stubley, 1992). Children generally love to play an instrument and have every confidence that it is possible for them to learn to do so (Ferris, 1998). The majority of Australians who play instruments started playing while they were children (Nexus, 2001). Learning to play an instrument can help students become confident, enthusiastic, active and creative agents (Davidson & Borthwick, 2002; Rife, Shnek, Lauby and Lapidus, 2001).

The approach taken by a school or a teacher to instrumental teaching depends on the overall goal. The goal could be the development of an elite group of expert players or the goal could be to maximise student participation by introducing all students to instrumental skills (Cope, 1998). In order to encourage participation and create enthusiastic students, music needs to be enjoyed and played for its own sake. To do this, teachers need to capture and consolidate the rewards of participation before offering systematic skills training (Cope, 1998).

Temmerman (2003) argues that both general music appreciation classes and instrumental classes are important and should be taught in harmony with each other in order to create a more 'holistic' approach to music education in the primary school. Currently, many students view instrumental music as 'real music' and classroom music as 'what we have to do' in class - without realising the connections between the two (Yourn, 1999). Yourn (1999) reports on a study which revealed that 72% of Australian music educators felt that the integration of instrumental and classroom music would create a more 'holistic' education. A holistic education needs to also include the integration of music in other subject areas. Instrumental and classroom teachers can enrich student understandings and create a more 'holistic' education through focusing on the same goals. Students can also gain greater meaning as they link learning from both programs (Yourn, 1999).

In NSW, legislation passed in 1990 made it mandatory to provide classroom with music instruction however no weekly period of time was prescribed or mandated for this instruction in government schools (Stevens, 2003). Typically, it is expected that music will be included in the primary school for a minimum of 30 minutes each week (Stevens, 2003). Some schools particularly the highly financed private schools run innovative music programs that benefit all their students and which provide outlets for their talented musicians (Chadwick, 2000). However research indicates that, despite the many reports which have been undertaken into the issue, inadequate music programs continue to exist particularly in state primary schools (Jones, 2004; Russell-Bowie, 2003). Jones (2004) argues that music continues to be "undervalued and inconsistently taught subject in many primary schools" (p.2). Some schools continue to run music classes by generalist teachers which consist mostly of having students sing along with the 'Sing' book audio series (Jones, 2004). It appears that music continues to have a low priority in many schools and that many schools lack quality music education programs.

In NSW, music can be provided differently in each primary school and can be taught by classroom teachers, on-staff music specialist teachers, volunteer parents, a local musician or in some cases by a specialised outside music teacher who teachers weekly or fortnightly classes while the classroom teacher is given release time to prepare material for other lessons (Stevens, 2003). However, because of economic limitations the presence of specialist music teachers has declined (Russell-Bowie, 2003) and responsibility for teaching music increasingly lies with the class teacher. What is more, many schools are not in the financial situation to be able to provide adequate equipment or music facilities (Russell-Bowie, 2003; Stevens, 2003). Instruments are generally expensive to purchase and many schools have limited student resources. Evidence suggests that many Australian schools do not offer performance based music because one survey found that only a half of all students aged 5-17 were identified as participating in a school instrumental music program. The recorder provides students with an inexpensive alternative while assisting in the teaching of real skills and real music.

Nature of this Study

The general classroom teacher, who planned the recorder program, invited the researcher into the classroom to observe the program and collect data to be used for academic purposes. This teacher administered this sequential skills-based program to students in the experimental class for 15-minutes, four times per week in addition to the regular music program directed by a specialist music teacher. This regular music class met for 30-minutes per week and took the generalist approach. The control class only took this music session. The music program as taught to the experimental class reflected both the extrinsic music education philosophy and the

intrinsic music education philosophy in that the students had the benefit of both the generalist perspective and the performance-based program using the recorder. It therefore provided a holistic approach to music education. In comparison, the control class received only the general music appreciation program. The results of this study should inform music teachers about the effectiveness or otherwise of the holistic approach to music teaching.

The following chapter will outline the research method in some detail.

Chapter 3

Methodology

Introduction

This chapter outlines the research design employed in the study. It describes the quasi-experimental nature of the study, the test instruments used and the collection of data. It also summarises the ethical procedures and protocols which were followed and explains the nature of the data analysis.

Background to the Study

This study was set in an independent primary school and focused on two classes of year-five students. Both classes received the normal half-hour music lesson as taught by a visiting music teacher. The regular teacher of one class organised and executed four 15-minute sessions per week using the recorder. This class became the experimental class while the second class who were not taught the recorder were the control class.

Because of the number of special conditions, this study can be classified as having a quasi-experimental design (Busch & Sherbon, 1992). It is experimental in that it compares the effects of two different music programs, as taught to two year-five classes. It is quasi-experimental because the researcher had no control over the selection and placement of participants and the researcher was merely an observer of the basic music program and the additional recorder program (Cohen, Manion & Morrison, 2000). It needs to be noted that these musical programs would have occurred with or without the research project being run. The contribution of the researcher lay in determining and implementing sets of pre and post tests.

Nature of the Regular School Music Program

Both the control class and the experimental class were provided with thirty minutes of music each week that were taken by an external music teacher who worked part-time for two days a week. The music teacher reported that the infrequent classes made it hard to get to know the students and timetabling was a difficulty. For example the experimental class had a ten minute session of music class before recess and twenty minutes after recess. This was the first year the current teacher had taught music, the previous year the school had several music teachers however this instability created difficulties. This year, the focus of the year five term one musical program involved finding out the students' prior musical knowledge. Students who played an instrument were asked to perform for the class. The focus was also on reviewing the basic elements of music as outlined in the NSW K-6 Creative Arts syllabus (Board of Studies, 2000). These musical concepts were duration, pitch, dynamics, tone colour and structure. This progressed towards the creation of student composition. Those students who have a strong musical background were encouraged to compose their own songs and those students who had little musical knowledge were encouraged to work in groups to create a rap.

Classroom Recorder Program

The additional musical program as taught to the experimental class focused on learning to play the recorder and occurred for fifteen minutes, four times a week. In this program the students were taught a sequential, skills-based recorder program using the book 'Listen and Play Recorder' (Cox & Gath, 1992). Students played along with tapes which provided an upbeat accompaniment to the pieces they were learning. The book provided a limited number of songs focusing on each new note. As the program developed and in order to minimise students playing by ear, the general classroom teacher started to introduce the

students to more challenging worship pieces such as "Where the Sun Shines" or "Got No Reason" using the overhead projector and a guitar accompaniment.

The classroom teacher regularly began with warm-up exercises. These consisted of activities such as: fingering along with the tape; individual students playing bars of a piece of music; finger memory activities; echoing a short tune created by the teacher and stating what notes were used. Students also participated in rhythm and duration activities such as following large hand movements made by the teacher along with music heard on a classical CD.

Students were taught social skills important to music such as the importance of listening to other class ensemble members and self evaluating their own playing. Students were regularly required to raise their hand if they were happy with how they performed. Technical skills such as tonguing, breathing, playing by ear to echo the teacher, posture, fingering, sight reading and the importance of keeping a continual pulse in the students' head were also emphasised. The recorder program also focused on theoretical skills such as identifying and knowing the meaning of an anacrusis, repeat sign, time signatures, treble clef and tie notes as well as the naming of notes and note values.

Aim of the Study

Research Questions

This study aimed at gathering data in order to answer the following questions:

1. Did the additional recorder program have an impact on the musical knowledge and skills of the students in the experimental class as compared to their counterparts in the control class?

2. If so, what factors may have contributed to the students' development of musical knowledge and skills as measured by a specifically created test of musical ability?
3. What theoretical and technical skills and understandings, in relation to music, did the students in the experimental class learn or develop from the special recorder sessions?
4. Did the recorder program influence measures of the students' general creativity?

Ethical Procedures and Protocols

The program being studied by the researcher would have taken place with or without the research project. The only intrusion involved observation and the testing procedures. Neither of the purchased tests (Raven's Matrices or Torrance Test of Creative Thinking) required special status to implement and students' names were employed only as long as needed for coding data into the computer. Once all the cases were coded, students' name lists were destroyed. Permission to run the study was also obtained from the educational authorities of the school system and the school itself. The principal and classroom teachers were happy to cooperate with the study. Student participation was voluntary and a letter of consent (See appendix I) was sent to the parents of the students. No parent withheld their child from the study and the identity of all participants has been protected. The recorder class did not occur to satisfy this study and the program would have been undertaken irrespective of the collection of data. Ethics approval was obtained from the Avondale College Human Research Ethics Committee.

Research Procedure

Pre-Test

At the commencement of the study the students in both year five classes were tested for spatial deductive reasoning through the Ravens Matrices Test and for their creative abilities with the figural Torrance Test of Creative Thinking. These tests combined to create a test

lasting approximately one hour. The tests were administered to both the experimental and control classes at the same time on the same day. The classroom teachers were not involved in the test administration or data collection. The researcher administered the test to one year five group while an independent and trained assistant administered the test to the other. The test protocols were identical for both groups.

The Raven's Progressive Matrices (Raven, 1989) is a test constructed to measure an individual's ability to form perceptual relations (Raven, Raven & Court, 2000). It therefore measures an individuals "intellectual and reasoning ability and the ability to make sense of complex data, to draw meaning out of ambiguity and to perceive and think clearly" (Raven, Raven & Court, 2000, p.5). This test has been widely used and has high reliability and validity. Adults and children of all ability levels can use raven's Progressive Matrices and it does not need to be administered by a psychologist.

The Figural Torrance Tests of Creative Thinking (Torrance, 1999) is a widely used divergent thinking test used to measure "generalised mental abilities that are commonly presumed to be brought into play in creative achievements" (p.1). This test uses three picture-based exercises to assess five mental characteristics: fluency, originality, elaboration, abstractness of titles, and resistance to closure. It is designed to be used with children and adults and lasts approximately 30 minutes.

The researcher marked these tests in accordance with test assessment guidelines. The Ravens Progressive Matrices Test was scored using a marking key. Each student was given a numerical test score on the number of questions answered correctly in the test. Results of the figural Torrance Test of Creative Thinking were marked using the provided streamlined scoring sheet. Students were scored for fluency, originality, elaboration, abstractness of titles and resistance to premature closure. Any evident creative strengths were also scored

according to the streamlined scoring guide. These scores were combined to create a creativity index score.

The pupils' musical questionnaire was developed by the researcher to cover aspects of pupils' musical experiences both in and out of school including both closed and open-ended questions. Each student was also interviewed for approximately five minutes, asked a series of questions (see appendix II) and completed a set of researcher-developed musical activities (see appendix III). Students were asked about: musical background and ability; musical instruments currently or previously learnt; how long they have been learning the instrument and if they played in an orchestra or group. They were then asked to identify what instruments family members played, if they were having lessons for that instrument and if the family member was a member of a ensemble group. Students were asked if they attended any performances from these musical groups. They were then asked if they enjoyed the regular school music class. Students in the experimental class were also asked if they had learnt the recorder before this musical program commenced.

Individual ability tasks were then given to each student in an attempt to determine their musical knowledge. Students were shown a series of flash cards and asked to read five treble clef notes, five bass notes, the value and name of five different note values. They were then asked to repeat a simple rhythmic pattern (see appendix III). The number of bars correct was recorded. They were also required to clap a written rhythmic pattern from notation (see appendix III). Students scored an unsatisfactory if no attempt was made or if the attempt did not resemble the pattern. A satisfactory was given if students clapped the pattern and made only a few mistakes. A commendable was then given to those students who completed the pattern well. As a final activity students listened to 'Not-so-boring-minuet' originally composed by Bach (Sing, 1999). The students were asked to conduct to the music by drawing an invisible triangle in the air. It was recorded if the student could

pick the beat and then if they could conduct by identifying the primary beat of significance or the strong beat within each bar. These activities were thought to help determine the students' rhythmic abilities. All activities of the test were scored, summed and coded for entry into the SPSS statistical package.

Post-Test

After 11weeks of both programs, the students' creativity index was re-tested using the Torrance Test of Creative Thinking. The Torrance Test was administered to both the experimental and control classes at the same time on the same day. Identical procedures and protocols to the pre-test were followed. The figural Torrance Test of Creative Thinking was marked using the provided streamlined scoring sheet and each student was given a creativity index as in the pre-test. Students from both classes were not previously aware that there would be a post-test. Students from both the experimental and control classes were asked about their feelings towards their respective musical programs. Students from both classes were also asked to complete a set of researcher-developed musical activities. This post-test was identical to the pre-test (See appendix III). In addition to this generic music test, students were also given a second music test (see appendix IV) where they were required to identify and explain features of a piece of music they had not seen before. The sheet music used was the traditional piece "She'll Be Coming Round the Mountain" (contained in Leask, 1995).

Analysis of Data

A range of statistical procedures selected from the SPSS package (Brace, Kemp & Snelgar, 2000; Coakes, 2003; Pallant, 2001) was used to analyse the data. These procedures included the t-test and simple analysis of variance for difference in means and multiple analysis of variance to test for interaction between pre and post sources for the members of the two classes. A correlation table was employed to identify potential relationships between the

variables involved. Both post-test scores on musical ability and the Torrance test were made the dependent variables of exploratory causal models and multiple linear regression analysis was employed to test these models.

Prior to this project the researcher had little experience in statistical analysis and the broad range of statistical approaches were undertaken in order that she could begin to develop skills in statistical analysis. The following chapter presents the results of this analysis.

Chapter 4

Analysis of Results

Introduction

This chapter presents the results of the data analysis. It will firstly present a profile of the two classes and compare their sex, age, musical background and initial cognitive and creative abilities. The chapter will then investigate the post-treatment results involving the musical skills tests by comparing mean scores for the two classes and describing the interaction between the control and experimental classes on their pre and post scores. A tentative and exploratory causal model using the post-test score in musical ability as the dependent variable was developed to examine potential influences of the post-test measure of musical ability. This model was tested using a multiple, linear regression analysis. Finally the chapter examined the findings in relation to the Torrance Test of Creative Thinking post-test in which a second causal model was developed using the post-test score for the Torrance Test as the independent variable. This model was also tested using multiple linear regression analysis.

In carrying out these analyses, a number of variables were introduced and used. These variables are described in Table 4.1.

Sex, Age and Class Assignment of Participants

The students in the two year-five classes were assigned their class location by the school authorities with the intention of creating two mixed ability classes that were roughly equivalent to each other. The teacher of one of these classes organised an additional musical program for her students that was in addition to the regular school music program. This class became the experimental class while the class receiving only the regular school music program was called the control class. The two musical programs have been described in Chapter Three.

Table 4.1

Description of Variables Used in Analysis

Variable	Description
Age	Age of Students in years at the commencement of the study.
Sex	Gender of the student: male (1) or female (2).
Class Membership	The students assigned class, that is either the control (1) or the experimental class (2).
Ravens Score	Students score on the Ravens Progressive Matrices Test (2000).
Torrance Pre-test	Students score on The Figural Torrance Tests of Creative Thinking (1992) as administered at the commencement of the study.
Torrance Post-test	Students score on The Figural Torrance Tests of Creative Thinking (1992) as administered at the conclusion of the study.
Music Skills Pre-test	Students score on the researcher-developed music skills test at the commencement of the study.
Music Skills Post-test	Students score on the researcher-developed music skills test at the conclusion of the study.
Family Musical Influence	Measure of the musical environment of the home based on instruments played by immediate family members.
Private Music Tuition	Measure of students' current involvement in private musical tuition.

Description of the Students' Involved

Table 4.2 provides a description of the students in the control and experimental classes. The 48 students taking part in the study included a total of 16 males and 32 females. There were 24 students in both classes and at the commencement of the study the ages of participating students ranged from nine to 11 years with the majority of students aged ten. The experimental class had two students who were aged nine as compared to the control class which had five more students who were 11 years of age. The control class consisted of seven males and 17 females while there were nine males and 15 females in the experimental class (see Figure 4.1). Four students from the control class and three students from the experimental class were not included in the study due to test absences.

Table 4.2

Age of Participating Students

Class	Age						Total		Grand Total
	9		10		11				
	M	F	M	F	M	F	M	F	
Control Class	0	0	6	10	1	7	7	17	24
Experimental Class	1	1	6	13	2	1	9	15	24
Totals	1	1	12	23	3	8	16	32	48

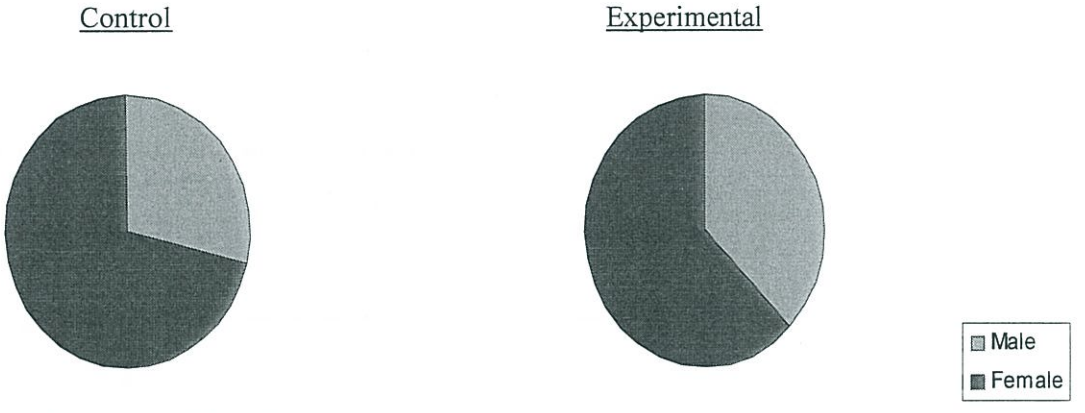

Figure 4.1 Gender Division of Both Classes

Musical Background Within the Two Classes

Table 4.3 shows that 20 students in the experimental class stated that they played an instrument as compared with 14 students in the control class who indicated that they played an instrument. A Chi-square test of significance ($\chi^2 = 3.63$; $p > 0.05$) showed that these frequencies lay within the realm of chance and there was no significant difference. The most common instrument played by students in both classes was the piano; seven students in the control class and 12 students in the experimental class played this instrument. The second most commonly played instrument was the violin which was played by four students in both classes.

Table 4.3

Main Instrument Played

	Instrument	Control	Experimental	Total
Main	No Instrument Played	10	4	14
Instrument	Instrument Played	14	20	34
Played	Piano	7	12	19
	Clarinet	1	1	2
	Trumpet	0	1	1
	Violin	4	4	8
	Guitar	0	2	2
	Drums	1	0	1
	Other	1	0	1
Total		24	24	48

Table 4.4

Years Students Have Played their Main Instrument

	0 yrs	Less than 1yr	1-2yrs	3-5yrs	6 or more yrs	Total
Control	10	5	5	3	1	24
Experiment	4	7	7	5	1	24
	14	12	12	8	2	48

Table 4.4 indicates that the number of years the students reported playing their main instrument was generally the same for both classes. Five students in the control class and seven students in the experimental class have played their main instrument for less than one year and five students in the control class and seven students in the experiential class have played their instruments for one to two years. Three students in the control class and five students in the experimental class have played for three to five years and one student from each class has played for six or more years. At the time of the study nine students from each class were having private music lessons either during school or after school (see Table 4.5). Further, in the control class three students were also having private music lessons for a second instrument at the time of the study. In the experimental class one student was having private music lessons for a second instrument.

Table 4.5

Lessons on Main Instrument

Class	No Private Music Lessons	Private Music Lessons	Total
Control Class	15	9	24
Experimental Class	15	9	24

Table 4.6 provides a view of the instruments played by the family members of students. Four more mothers in the control class played an instrument when compared with the experimental class. The same number of fathers played an instrument in both classes. Four more siblings in the experimental class played an instrument when compared with the control class. Family instrumental choices in both classes were very similar. The most common instrument played by the students' mothers was the piano, followed by the guitar. The guitar was the most common instrument played by the fathers, followed by the piano. Siblings played a variety of instruments, however, the most common instrument played by siblings in both classes was the piano.

It would appear that the musical abilities of the students in these two classes were better than that of the average year five student from the general population. Further it can be argued from the information presented in these tables that there was no significant difference in musical involvement between the students of the two classes, nor was there any apparent difference in the musical environment of the homes from which the students of the two classes came.

Table 4.6

Main Instrument Played by Family Members

Class	Instrument	Mother	Father	Sibling 1	Sibling 2	TOTALS
Control	No Inst. Played	17	17	10		
	Piano	5	3	6	2	16
	Flute	0	0	2	0	2
	Clarinet	0	0	1	1	2
	Trumpet	0	1	0	0	1
	Guitar	2	3	3	2	10
	Drums	0	0	1	0	1
	Sax	0	0	0	0	0
	Violin	0	0	1	1	2
	Other	0	0	0	0	0
Experimental	No Inst. Played	13	17	12		
	Piano	6	2	7	1	16
	Flute	1	0	0	1	2
	Clarinet	1	0	0	0	1
	Trumpet	1	0	2	0	3
	Guitar	2	4	3	1	10
	Drums	0	0	0	0	0
	Sax	0	1	0	0	1
	Violin	0	0	0	0	0
	Other	0	0	0	1	1

Tests of Cognitive and Creative Abilities of Participants in the Two Classes

The students of both classes were given the Ravens Matrices Test of cognitive ability and the Torrance Test of Creativity. Table 4.7 provides the results of the test of difference of means (t test) for the Ravens Matrices Test. The Levine Test ($F= 0.464$; $p = 0.499$) allowed an assumption of equal variance for the Ravens Matrices Test across both classes. The t test ($t = -1.586$; $p = 0.120$) indicates that the difference between the means for the two classes, as measured by the ravens matrices test, was not significant. Therefore it is assumed that the two year five classes have students of roughly equal cognitive ability.

Table 4.7

Ravens Matrices Independent Samples T Test

Levine's Test F = 0.464, p = 0.499 No Difference in Variance

	Number	Mean	Standard Deviation	t	Degrees of Freedom	Significance
Control	24	24.54	6.71	-1.586	46.0	0.120
Experiment	24	27.48	6.01			

Table 4.8 shows the results of the test of difference of means (t test) for the Torrance Tests of Creative Thinking. The Levine Test (F= 8.43; p = 0.006) showed that the p value was less than 0.05 which meant that equal variance was not assumed across both classes. Nevertheless the t test (t = 0.51; p = 0.61) indicates that the difference between the means for the two classes, as measured by the Torrance Test, was not significant (See Table 4.8). Therefore it is assumed that students of the two year five classes have roughly equal creative thinking ability as measured by the Torrance Test.

Table 4.8

Torrance Test of Creative Thinking Pre-test

Levine's Test F =8.43 p =0.006 Variance Regarded as Different

	Number	Mean	Standard Deviation	t	Degrees of Freedom	Significance
Control	24	92.15	6.89	.51	46	.61
Experiment	24	90.75	11.60			

Test of Musical Ability

The musical pre-test and post-test have been described in the previous chapter. Both tests were generic in nature and included several components. Results for these components were summed to provide a total score for each test. The results of the pre-test are shown in Table 4.9. The experimental class had a mean of 12.0 and a standard deviation of 7.81 while the control class had a mean of 10.0 with a standard deviation of 4.93. The difference between these mean scores for the two classes on the musical pre-test (as seen in Table 4.10) was not significant ($F = 1.13$; $p > 0.05$).

Table 4.9

Music Skills Pre-test Components and Mean Scores

Test Item	Control Class Component Average Score: Mean (Standard Deviation)	Experimental Class Component Average Score: Mean (Standard Deviation)
Reading Five Treble Notes	1.2 (1.62)	1.9 (2.08)
Reading Five Bass Notes	0.2 (1.02)	1.2 (1.99)
Identifying Five Note Values	2.0 (1.84)	1.5 (2.04)
Naming Note Values	0.3 (1.04)	0.6 (1.41)
Repeat Rhythmic Pattern	0.8 (0.57)	1.1 (0.61)
Clap Notation Pattern	1.1 (0.83)	1.0 (0.69)
Conducts on the beat	1.4 (0.50)	1.5 (0.51)
Identifies the Strong Beat	1.8 (0.28)	1.2 (0.42)
Total Score for Music Pre-test	10.0 (4.93)	12.0 (7.81)

Table 4.10

Difference of Means Between the Two Classes

	Sum of Squares	Degrees of Freedom	Mean Square	F	Significance
Between Classes	48.00	1	48.00	1.13	0.29
Within Classes	1962.00	46	42.65		
Total	2010.00	47			

The results indicate that the students of the two classes were very similar in age range, in the proportions of the sexes, musical background, cognitive and creative abilities and in musical skills. Tests of statistical significance revealed no difference between the two classes at the onset of the study.

Treatment of Musical Post-test Results

Post-test of Musical Skills

As described in the previous chapter, the experimental class received 11 weeks tuition in a skills-based recorder program in addition to the regular school music class. At the conclusion of this time both classes undertook the musical post-test and the figural Torrance Test of Creativity. The results of the post-test for music are found in Table 4.11. The experimental class had a mean of 16.6 and a standard deviation of 7.54 while the control class had a mean of 11.8 with a standard deviation of 5.90. The different between the mean scores (as seen in Table 4.12) was significant ($F = 6.22$; $p < 0.05$).

Table 4.11

Music Skills Post-test

Test Item	Control Class Component Average Score: Mean (Standard Deviation)	Experimental Class Component Average Score: Mean (Standard Deviation)
Reading Five Treble Notes	1.6 (2.08)	2.2 (1.99)
Reading Five Bass Notes	0.5 (1.45)	1.2 (2.15)
Identifying Five Note Values	2.7 (1.57)	3.3 (1.58)
Naming Note Values	0.7 (1.47)	2.2 (2.14)
Repeat Rhythmic Pattern	0.9 (0.68)	1.3 (0.64)
Clap Notation Pattern	1.1 (0.80)	1.4 (0.71)
Conducts on the beat	1.3 (0.44)	1.7 (0.46)
Identifies the Strong Beat	1.1 (0.28)	1.3 (0.48)
Total Score for Music Pre-test	11.8 (5.90)	16.6 (7.54)

Table 4.12

Difference of Means Between the Two Classes

	Sum of Squares	Degrees of Freedom	Mean Square	F	Significance
Between Classes	285.19	1	285.19	6.22	0.016
Within Classes	2108.13	46	45.83		
Total	2393.31	47			

Results for an Additional Theory Test

In addition to the post-test in music, students of both classes were given a second musical test (see appendix X labelled 'Additional Theory Test') where they described certain features of a piece of written sheet music. The results of this additional music test appear in Table 4.13. This test was developed with knowledge of the content of the additional recorder program being undertaken by the experimental group and related to skills taught in the recorder program. Table 4.13 shows that the experimental class had a mean of 9.3 and a standard deviation of 1.07 while the control class had a mean of 6.8 with a standard deviation of 1.41. The different between the mean scores (as seen in Table 4.14) was highly significant ($F = 46.04$; $p < 0.05$). It was to be expected that the experimental class would outperform the control class on this test and these results merely confirm those expectations.

Table 4.13

Additional Theory Test

Test Item	Control Class Component Average Score: Mean (Standard Deviation)	Experimental Class Component Average Score: Mean (Standard Deviation)
Identifies time Signature	1.4 (0.50)	1.9 (0.34)
Explains the Time Signature	1.3 (0.44)	1.8 (0.44)
Identifies Repeat Sign	1.5 (0.51)	2.0 (0.00)
Identifies Tie Note	1.4 (0.50)	1.9 (0.34)
Explains Tie Note	1.2 (0.42)	1.8 (0.44)
Total	6.8 (1.41)	9.3 (1.07)

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Table 4.14

Differences of Means Between the Two Classes on Additional Theory Test

	Sum of Squares	Degrees of Freedom	Mean Square	F	Significance
Between Classes	72.52	1	72.52	46.04	0.00
Within Classes	72.46	46	1.58		
Total	144.98	47			

Interaction: Pre and Post-test Results Against Class Membership

The results in Table 4.12 indicate that there was no significant difference between the two classes on the generic pre-test for music skills. However, there was a difference between the two classes as measured by the generic post-test for music skills (see Table 4.14). This perception of difference, as measured by the post-test, was reinforced by an analysis of variance which simultaneously involved the results for the two classes on both pre and post musical tests (see Table 4.15). This analysis returned a significant interaction for test results against class membership ($F = 4.68$; $p < 0.05$). This comparison of class membership against pre and post-test results are also to be seen in Figure 4.2. These results imply that the *changes* in scores for the two classes on the pre and post-test for musical skills was significant and not a chance occurrence. Hence a mechanism of some sort was responsible. The most likely mechanism that could have caused this interaction was the 11-week recorder program as run for the students in the experimental class by their teacher.

Table 4.15

Interaction Between Music Test Scores and Class

	Sum of Squares	df	Mean Square	F	Significance
Intercept	15225.8	1	15225.8	195.47	0.000
Music Skills Pre and Post Test Scores	243.8	1	243.8	23.03	0.000
Class Membership	283.6	1	383.6	3.64	0.063
Music Skills Test Scores * Class Membership	49.6	1	49.6	4.68	0.036
Error	3583.1	46	77.9		

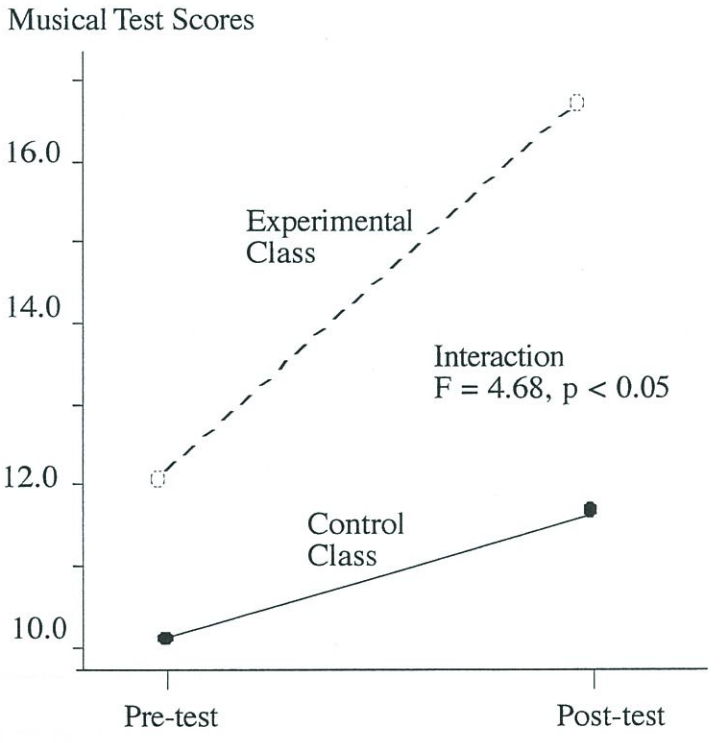

Figure 4.2. Score for Music Skills Test Pre & Post

A Pattern of Correlations

The correlation table (Table 4:16) reveals a number of interesting pair-wise relationships between some of the variables involved in the study. These relationships may have been involved in producing the change in means for the pre and post musical skills test and the Figural Torrance Test of Creative Thinking. Those correlations that are significant at the 0.05 level are indicated by a bold type and the table only shows correlations that exceed a magnitude of 0.2. The variables entered into the correlation process included the students Age, Sex, Class Membership, Ravens score, Torrance pre-test, Torrance Post-test, Music Skills Pre-test, Music Skills Post-test, Family Musical Influence and Private Music Tuition. The results present a cohesive view of the relationships between the variables.

Students who performed well on the pre-test of musical skills also scored well on the post-test ($r = 0.76$). There was a tendency for those students who come from a home environment where family members play musical instruments, to perform better on the music skills pre-test ($r = 0.41$) and post-test ($r = 0.39$) tests. In addition, students who performed well in the Torrance Test of Creativity post-test also scored well on the pre ($r = 0.36$) and post ($r = 0.32$) musical tests.

Males as a group tended to perform better on the Ravens Matrices test than the female students ($r = -0.29$). However the over representation of females in both classes could have influenced this result (see Figure 4.1). It appeared that students with higher cognitive ability as measured by the Ravens Matrices Test also tended to score more highly for creativity as measured by the Torrance pre-test of creativity ($r = 0.31$). As would be expected, the result the student achieved on the first Torrance test had a strong positive relationship with the Torrance post-test result ($r = 0.73$).

Table 4.16

Correlation Table Showing Correlations (r) with a Magnitude Greater than 0.2

Correlations in Bold are Significant at the 0.05 Level

		V1	V2	V3	V4	V5	V6	V7	V8	V9	V10	
V1	Age	1.00			-0.24		0.23		-0.23			V1
V2	Sex		1.00		**-0.29**						-0.27	V2
V3	Class Membership			1.00					**0.35**			V3
V4	Ravens Score				1.00	**0.31**	0.26	0.25	**0.32**			V4
V5	Torrance Pre-Test					1.00	**0.73**					V5
V6	Torrance Post-Test						1.00	**0.36**	**0.32**	0.24		V6
V7	Music Pre-test							1.00	**0.76**	**0.41**	0.21	V7
V8	Music Post-test								1.00	**0.39**		V8
V9	Family Musical Influence									1.00		V9
V10	Private Music Tuition										1.00	V10

Development of Musical Ability: As Explanatory Causal Model

It is one thing to observe that two classes of students undergoing two different music programs would produce final mean test results that differed significantly, but quite another thing to identify potential causes for the difference. This section sets out to use the regression techniques of path analysis to explore some of the potential influences on the production of the post-test music scores. Obviously those who scored well on the pre-test of musical skills also did so for the post-test ($r = 0.76$). However there was an array of exogenous background factors that could have also been involved. Background factors (or exogenous factors) are those that are present and could potentially influence the students' scores on the musical skills post-test (the ultimate dependent variable), but are independent variables that are not under the control of the researcher and are variables whose variance is determined by external factors. These include the students' age, sex, class membership and intelligence as scored on the Ravens test. Other factors include the musical influence of the students' homes and their involvement in private music tuition. These considerations led to the development of a tentative and exploratory model of causality as shown in Figure 4.3. This model is exploratory in that it was developed from the research and was not developed from a body of theory that arose out of the literature review.

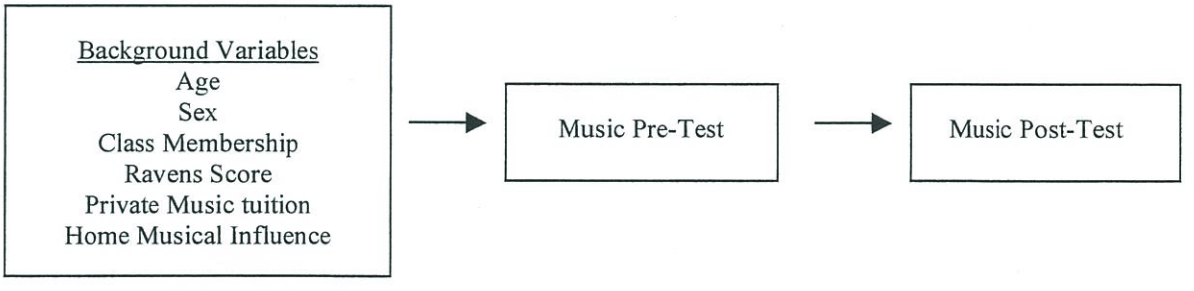

Figure 4.3. Model of Causality in Relation to the Musical Skills Post-test

The relationships between the variables in this model were tested by the use of multiple regression analysis in which all variables were entered as Z-scores (standardised scored). The method of analysis employed was a backward, stepwise process using the 0.05 level of

significance to determine variables that survive each step in the removal process. The variables left at the end of the process were significantly linked to the dependent variable by a linear standardised regression equation. In standardised regression equations the constant term is zero. Hence a typical equation could involve the dependent variable D being linked to the independent variables V_1 and V_2 by corresponding coefficients β_1 and β_2.

Such an equation would have the form as shown below.

$$D = \beta_1 . V_1 + \beta_2 . V_2$$

Given that the means of all variables in the z-score form are zero, if V_1 is held in its mean position, and V_2 were allowed to vary by one standard deviation, then the change in the dependent variable, D, would be given by β_2 of one standard deviation. Consequently the coefficients of the variables which remain in the standardised regression equation after the backward stepwise process indicate the strength of the respective relationships between the dependent variable and the independent variables. Thus the coefficients of the standardised regression equation provide comparative measures of the strength of the relationships in the model (see Pedhazur, 1997; Stage, Carter & Nora, 2004). The conclusions of the model must be treated with caution since the model is exploratory and since it is outside of the guidelines of 20 participants per variable included in the process (see Chapter Five; Stage, Carter & Nora, 2004).

Testing the Causal Model

Musical Skills Tests

The relationships between the multiple variables as shown in Figure 4.3 were weighted using backward stepwise multiple linear regression analysis. Table 4.17 highlights the dependent variable and their respective coefficients which remained after the repeated use of standardised regression equations using the variables 'Music Skills Post-test' and 'Music Skills Pre-test' as the successive dependent variables.

In the initial analysis the variable 'sex' was shown to be significantly linked to the 'Music Skills Pre-test'. This was in contrast with the correlation (r = 0.06) which was negligible. It was noted that both classes had a disproportionate number of females and that 'sex' had a significant relationship with 'Ravens Score' (r = - 0.29). Hence it was felt that a problem of collinearity may have existed and the variable 'sex' was therefore removed from the model. The removal of this variable from the process is one means of approaching the problems of collinearity (see Pedhazur, 1997). When the model was again tested a very slight decline in the path coefficient of 'Ravens Score' was noted which was consistent with the assumption of the presence of collinearity.

Table 4.19 presents the results of the regression analysis and shows that 63% of the variance of 'Music Skills Post-test' was explained by the two variables 'Class Membership' and the students score on the 'Music Skills Pre-test'. The table also shows that the variable 'Music Skills Pre-test' was dependent upon the three variables 'Ravens Score', 'Private Music Tuition' and 'Family Musical Influence' and these component variables accounted for 27% of variance in 'Music Skills Pre-test'.

Table 4.17

Regression Analysis of the Musical Tests

Dependent Variable	Independent Variable	Beta	t	Significance	R^2
Music Skills Post-test	Class Membership	0.23	2.542	0.015	0.63
	Music Skills Pre-Test	0.72	7.873	0.000	
Music Skills Pre-test	Ravens Score	0.23	1.774	0.083	0.27
	Private Music Tuition	0.24	1.849	0.071	
	Family Musical Influence	0.39	2.961	0.005	

Relationships between the variables were translated into a path diagram as shown in Figure 4.4. This model represents all factors which survived the regression process that have an influence on "Music Skills Post-test". It can be seen that the variable "class" does not have a

relationship with the "Music Skills Pre-test" however it is the only variable other than "Music pre-test" which has a direct influence on the dependent variable "Music Post-test".

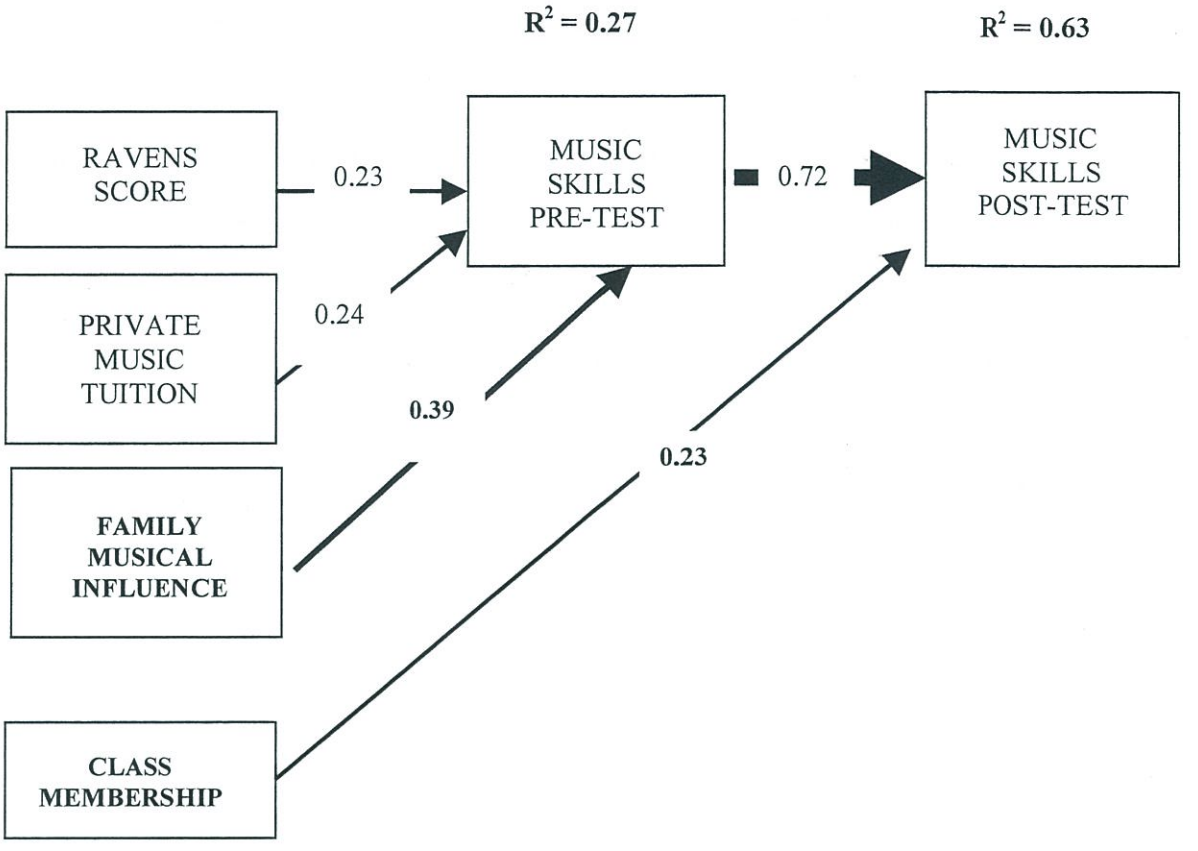

Figure 4.4. Measure of the Variables' Contributions to Respondents "Music Skills Pre-test"

General Implications of the Model

This model (Figure 4.4) represents factors entered into the regression process which have influenced the dependent variable "Music Post-test". Only two variables, 'Music Pre-test' (path coefficient 0.72) and 'Class Membership' (path coefficient 0.23) survived the backward stepwise process to remain linked to the dependent variable 'Music Post-test'. It was to be expected that pre-test should be the strongest predictor of post-test. When 'Music Pre-test' was made the dependent variable, a range of variables remained at the end of the backward stepwise process. These included the students 'Ravens Score' (path coefficient 0.23), participating in 'Private Music Tuition' (path coefficient 0.24) and 'Family Musical Influence' (path coefficient 0.39).

In other words, the model suggests that those students with superior cognitive ability who were in receipt of musical tuition outside of the school program and who came from a family environment that was rich in musical influence tended to score more highly on the musical skills pre-test. It is notable that the variable 'class membership' was not related to 'Music Pre-test', meaning that both classes performed generally the same on that test. Yet the variable 'Class Membership' (path coefficient 0.23) had a direct effect on student performance on the 'Musical Post-test'. Class membership represents the different musical programs that involved the students of the two classes. Those who belonged to the experimental class and participated in the recorder program tended to score more highly in the music skills post-test. These results were not chance and implied that the recorder program may have made a significant contribution toward the development of musical ability among the students of the experimental class.

Post Treatment Results for Creativity

Interaction: Pre and Post Torrance Test Results

The students were tested twice by the Torrance Test of Creative Thinking the first at the commencement of the program and the second, at the conclusion of 11 weeks of the program. There was no significant difference between the mean scores for the two classes on the Torrance Test when it was administered at the commencement of the study (as seen in Table 4.8). However, there was a difference between the mean post-test scores for the two classes that was significant at the 0.05 level. This was reflected by an interaction effect that occurred between the pre and post-test results for the two classes ($F = 4.40$; $p < 0.05$) as seen in Table 4.18 and in Figure 4.5. These results suggest that the differences between the means was not a chance occurrence and that something happened in the year-five experimental class over the

period of the study that caused the change in performance results. The differences in musical programs may have been a contributing factor in causing the interaction.

Table 4.18

Interaction Between Torrance Test Scores and Class

	Sum of Squares	df	Mean Square	F	Significance
Intercept	818553.5	1	818553.5	5383.13	0.000
Torrance Pre and Post Scores	76.0	1	76.0	3.50	0.068
Class Membership	8.5	1	8.5	0.056	0.814
Torrance Pre and Post Test Score * Class	95.6	1	95.6	4.399	0.041
Error	6994.709	46	152.1		

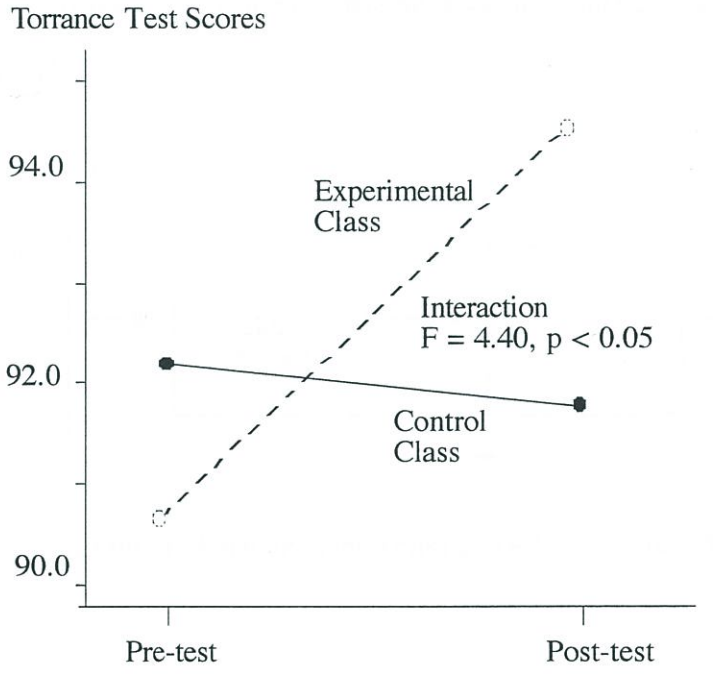

Figure 4.5. Mean Scores for Torrance Pre-test and Post-test

Development in Creativity: An Exploratory Causal Model

The model of causality that was developed is represented in figure 4.6. Because of the correlation between pre-test and post-test scores on the Torrance Test, it was expected that those who performed well on the Torrance post-test would also perform well on the Torrance post-test ($r = 0.71$). Nevertheless, additional exogenous factors could well have influenced student performance on the Torrance post-test. Possible background variables include class membership, age, Ravens Matrices test score, music pre-test score, private music tuition or the students' home musical environment. However, musical skills pre-test was entered into the model as an endogenous variable. The relationships between the variables in this model were tested by multiple backward regression analysis as (explained for the musical post-test). The 0.05 level of significance will be used to determine variables that are significantly linked to the dependent variable.

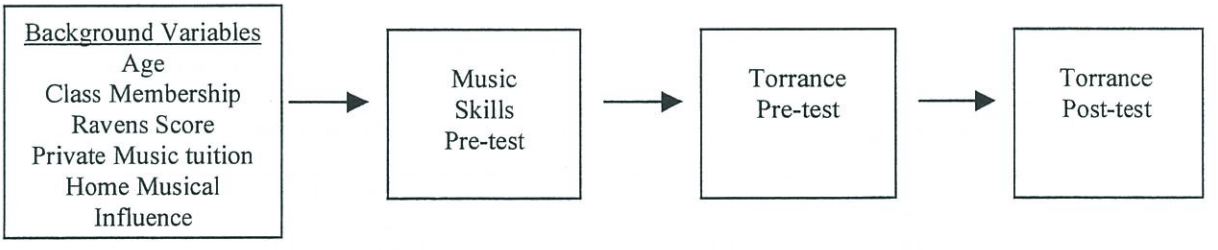

Figure 4.6. Model of Causality in Relation to the Torrance Test of Creative Thinking Post-test

Testing the Explanatory Causal Model

The Torrance Test of Creative Thinking Tests

Table 4.19 shows the results of the backward stepwise multiple linear regression analysis. The dependent variable 'Torrance Post-test' and coefficients which developed out of the repeated use of standardised regression equations are shown in the table. The table also indicates that 60% of variance of 'Torrance Post-test' was explained by the variables 'Torrance Pre-test' ($\beta = 0.71$), 'Music Pre-test' ($\beta = 0.23$) and 'Class Membership' ($\beta = 0.16$). Fourteen percent of variance for the dependent variable 'Torrance Pre-test' was explained by the variables 'age' and 'Ravens Score'. The regressions equation for the dependent variable 'Music skills pre-test' explained 27% of the variance of the variables 'Ravens Score', 'Private Music Tuition' and 'Family Musical Influence'.

Table 4.19

Regression Analysis of the Torrance Test of Creative Thinking

Dependent Variable	Independent Variable	Beta	t	Significance	R^2
Torrance Post-test	Torrance Pre-test	0.71	7.532	0.000	0.60
	Class Group	0.16	1.711	0.094	
	Music Pre-test Score	0.23	2.441	0.019	
Torrance Pre-test	Age	0.30	2.131	0.039	0.14
	Ravens Matrices Score	0.38	2.758	0.008	
Music Skills Pre-test	Ravens Matrices score	0.23	1.774	0.083	0.27
	Private Music Tuition	0.24	1.849	0.071	
	Family Influence	0.39	2.961	0.005	

The path diagram in Figure 4.7 represents all factors that withstood the regression process and which potentially influence the dependent variable 'Torrance Post-test'. Of those variables which survived the backwards analysis, 'Torrance pre-Test' with a path coefficient of 0.71 became the strongest predictor of the students' score on the 'Torrance post-test'. Other factors that contributed to the post-test score on the Torrance Test included ability in music as measured by the pre-test score in musical skills (path coefficient 0.23) and membership of the

experimental class (path coefficient 0.16). The model also suggests that students who performed well on the 'Torrance Pre-test' tended to be older in age (path coefficient 0.30) and to have superior cognitive ability (path coefficient 0.38). Factors related to the musical skills pre-test have been previously described and are visible in figure 4.7.

The model also suggests that the students' score on the music skills pre-test and their designated class did not influence the 'Torrance Pre-test' variable yet both influenced the 'Torrance Post-test'. The variable 'Class Membership' played an interesting role because this is a significant background factor which did not influence the 'Torrance Pre-test' or 'Music Pre-test', nevertheless, it survived the regression process and influenced the 'Torrance Post-test' with a path coefficient of 0.16. Although this is a minor relationship, it is still worthy of attention and is of interest in this study. It implies that there was some mechanism to which the experimental class was exposed that resulted in increased measures of creativity. It is likely that the recorder program could have contributed to this increase. However the study cannot claim that this is the sole cause of the effect because other factors related to other school subjects could have also influenced the final outcome.

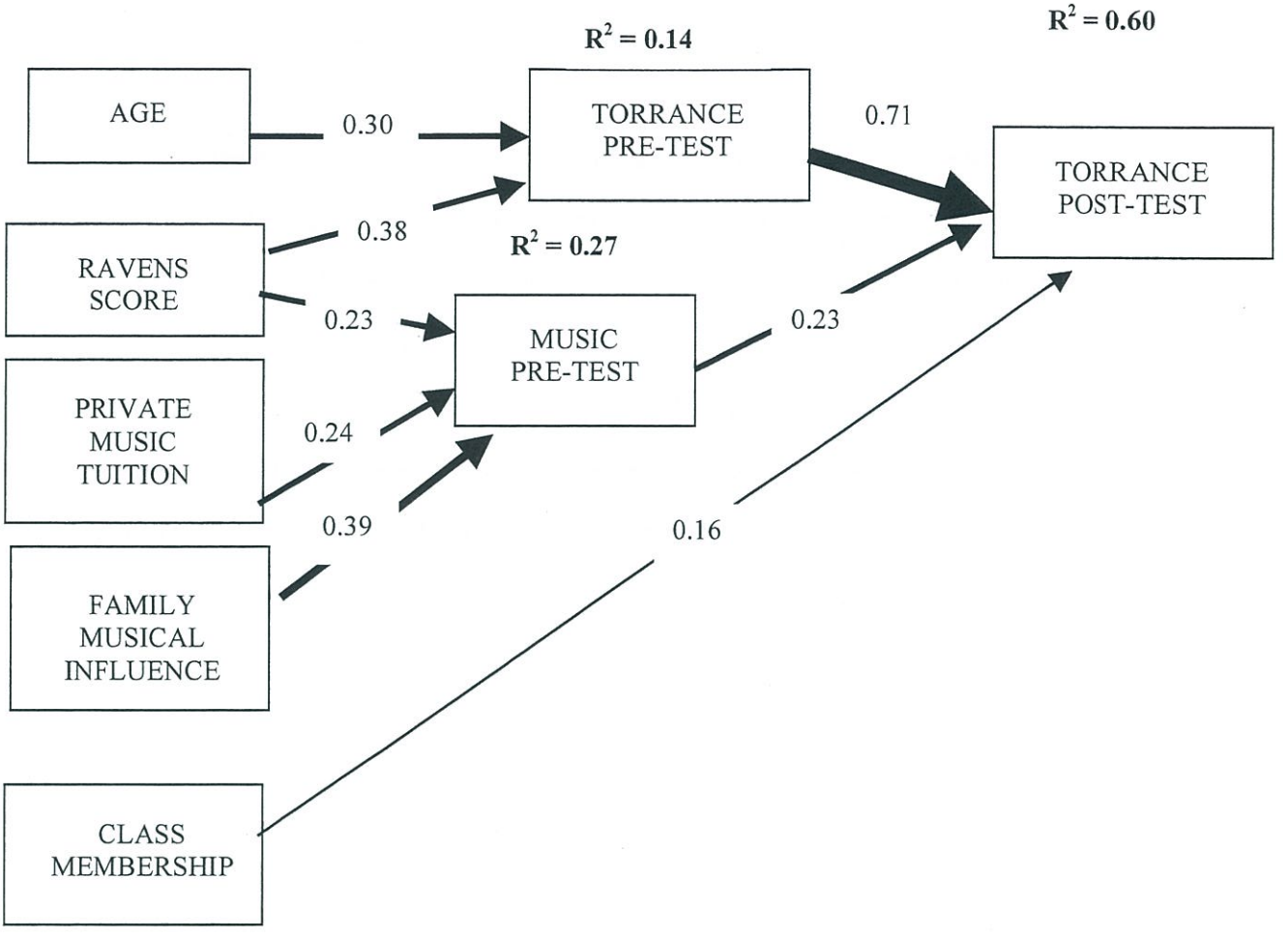

Figure 4.7. The Measure of the Variables' Contributions to Torrance Post-test

Discussion and Conclusion

Prior to the commencement of the period over which the music programs ran, the students in the control class and the experimental class were found to be approximately equivalent in measures of musical knowledge and skills, cognitive and creative abilities and in measures of musical influence of the home. The students in each class then underwent a course of musical instruction. Both classes participated in a weekly 30-minute class administered by the specialist school. In addition to this, regular school program the experimental class also participated in a classroom recorder program for 15-minutes, four times per week. Both

classes were tested for musical skills at the conclusion of the 11 week program. An interaction between the pre and post-test scores for the two classes was found to be significant which suggested that these results were not a chance occurrence. Hence a mechanism could have been considered to be operating in order to cause the differing results in musical skills post-test for the students in each of the two classes. This mechanism is likely to have been the influence of the additional musical program administered to the experimental class learning the recorder. That is, the additional program is the most likely mechanism responsible for the attainment of superior musical skills and knowledge by the students in the experimental class as compared to those in the control class. This conclusion was reinforced by yet another test of musical ability administered at the conclusion of the study. This specific test indicated that students in the experimental class learnt significantly greater knowledge related to written sheet music.

This relationship was revealed in greater detail by the path model which indicated that students from musical homes who had high cognitive ability and who were taking private tuition for a musical instrument performed better on the music skills pre-test. However the model indicated that 'class membership' was only related to results in the music skills post-test. This implies that students in the experimental class who undertook an additional classroom music program, learning the recorder, gained greater benefit from their enriched musical program than did the students in the control class who undertook only the more standard program.

The results of the study suggest that an enriched musical program could also influence the development of creativity. A significant interaction between class membership and pre and post Torrance Test of creative Thinking also indicated the presence of some mechanism that resulted in the elevated scores of the students in the experimental class. The study notes that this result is consistent with the results of previous studies (Hamann, Bourassa & Alderman, 1991, 1990; Kalmar, 1982; Leibowitz, 1978; Silverman, 1962; Simpson, 1969; Torratus, 1969; Wolff, 1979). However this study can not be certain about the cause of this effect

because other factors, not included in the study, could have been involved. These will be discussed later.

In addition, the path analysis revealed a complex pattern of involvement in the post-test score of the Torrance test. As expected, the pre-test results had the strongest linkage to the post-test scores and would be responsible for the 'lion's share' of the 60% of variance explained by the dependent variable. However it mediated two other background variables – age and cognitive ability. Age will most likely represent growing maturity or a broad scale of learning. The model indicates that those who had greater initial musical ability (as tested by the musical pre-test) tended to have higher scores on the Torrance post-test. As with the Torrance pre-test, the musical pre-test also mediated the effect of cognitive ability. Hence of all the exogenous variables in the model, cognitive ability had the strongest effect on the post-test score of creative ability (total path coefficient is given by 0.38 X 0.71 + 0.23 X 0.23 = 0.32). The model suggests that intelligent students who had greater maturity and who had pre-existing musical skills tended to be more creative. However the model also suggests that activities in the experimental class also contributed to the increase in creativity during the 11 weeks between the pre and post-test scores on creativity. One of those activities was the recorder program. Again the reader must note that this model is exploratory and these results become suggestions for further study rather than evidence of immediate reality.

The following chapter will discuss the results presented in this chapter.

Chapter 5

Discussion & Conclusion

Introduction

Chapter Two of this thesis argued that music has an impact on the quality of human life. Music-making is a creative, social, physical and mental activity that has the potential to bring people together in a variety of enjoyable pastimes. It has the potential to influence an individual's mood and psychological activity and it has the ability to soothe the mind and reduce stress. Music and music-making is an important component of human cultural life and personal identity. Music can be pursued for enjoyment, self-expression and for cultural exchange. Therefore it has a place in the school curriculum.

Chapter Two also describes the role played by music in the New South Wales primary syllabus. Music is an integral part of the Creative Arts syllabus (Board of Studies, 2000) document and is included in the key learning are Creative and Practical Arts. Although staffing arrangements differ from school to school every school is expected to provide its students with a musical education. Opportunities should be provided for children to perform, organise and listen to sound using a variety of repertoire (Board of Studies, 2000). However, the philosophy of the syllabus is 'extrinsic' in nature leading to a generalist approach that deemphasises instrumental skills. The syllabus is often translated into one half hour lesson per week which emphasises a broad range of musical areas including singing, playing, moving, organising sound and listening (Stevens, 2003). At the other extreme are specialist groups where talented young musicians participate in ensemble groups, choirs or bands. What is missing is the sustained teaching of specific instrumental skills to all primary students. This means that most primary students are

rarely taught together in an adequate way thereby preventing students from receiving a quality, enriched musical program in the primary school.

This study is a quasi-experimental investigation in which the effects of two different musical programs as taught to two different year-five classes were compared for their effects upon the development of the students' respective musical knowledge and skills. One class (the control class) was only involved in the half-hour musical program each week as taught by the part-time music teacher. The content of this class was based on outcomes from the NSW K-6 Creative Arts Syllabus (Board of Studies, 2000). Students were provided with broad experiences in a variety of areas. These areas consisted of basic elements of music including duration, pitch, dynamics, tone colour and structure. At the conclusion of the study the focus of this class became narrower and students began working in cooperative groups to create their own musical composition.

In contrast, the second class (the experimental class) experienced this same musical program as taught by the same part-time teacher and in addition also undertook four 15-minute music classes involving the recorder each week. In these sessions, the students of the experimental group learned to play the recorder through a sequential course administered by the general classroom teacher. Students learned as a group and all individuals were involved in the same classroom course irrespective of musical background or preferences. Each session the students participated in introductory activities, reviewed prior learning, practiced known pieces and extended this knowledge to new pieces. This program was developed using the book 'Listen and Play Recorder' (Cox & Gath, 1992) which students' shared in pairs. In addition, modern worship songs on an overhead projector were also used to supplement the musical course book. The variable 'class membership' became the indicator for students' involvement in the musical

program as run for the control class or their involvement in the dual program as run for the experimental class.

This study was directed towards answering the following four questions in relation to the two musical programs.

1. Did the additional recorder program have an impact on the musical knowledge and skills of the students in the experimental class as compared to their counterparts in the control class?
2. If so, what factors may have contributed to the students' development of musical knowledge and skills as measured by a specifically created test of musical ability?
3. What theoretical and technical skills and understandings, in relation to music, did the students in the experimental class learn or develop from the special recorder sessions?
4. Did the recorder program influence measures of the students' general creativity?

The nature of the test of musical skills and knowledge was an important aspect in providing answers to these questions. Individual ability tasks in this test measured students' ability to read five treble clef notes, five bass clef notes and five note values. Students were also required to recall the name of particular note values, read and interpret musical notation, echo clap a rhythmic pattern and conduct to an exert of music identifying the significance musical beats in each bar. This test therefore assessed each individual's note reading abilities, rhythmic knowledge, musical memory and the ability to feel the beat in a piece of recorded music.

In providing a response to the first three questions, the study established that the two classes were not initially different in musical ability, musical background, cognitive ability and creativity. Musical ability and background included the receipt of current music tuition and musical influences of the family. The piano followed by the violin was identified in both classes as the most popular instrument played. The number of years for which the students had played their main instrument was generally the same for both classes and the same number of students from each class were currently receiving private music tuition. The musical environment of the students' homes was also similar in both classes. This was shown by the instrumental choices among family members and the number of family members who played instruments. Finally, cognitive ability as measured by the Ravens Matrices Test and creativity as measured by the Torrance Test of Creative Thinking revealed that the differences between the class means was not significant and the classes therefore had students of roughly equal cognitive and creative abilities. Both classes were also similar for age division and proportions of the sexes.

Response to Research Question 1 and 3

Figure 4.2 indicates that according to the post-test results of musical ability, the students in the experimental class who were involved in the dual musical program showed greater development of their musical skills and were more advanced in a range of musical skills and knowledge at the end of the 11 week program than did their counterparts in the control class. Further, the experimental class performed better than the control class on all components of the test. These areas included reading five treble notes, reading five bass notes, identifying five note values, naming note values, repeating a rhythmic pattern, clapping a notation pattern, conducting on the beat and identifying the strong beat in each bar. The additional musical test conducted at the end of the 11 week program confirmed these results.

The thesis argues that the holistic approach gained by the combination of the regular musical class and the instrumental program was responsible for the improved musical knowledge and skills as shown by the students in the experimental class. It also notes that the experimental class was involved in 1½ hours of music per week as compared to the ½ hour of music as taught to the control class. This is a significant increase in time (a factor of 3) and must be partially responsible for the effect.

Response to Research Question 2

The exploratory causal model shown in figure 4.3 provides a view of the factors contributing toward the development of musical knowledge and skills. It indicates that those who performed well on the pre-test of musical skills and knowledge tended to have sound cognitive abilities (path coefficient 0.23), to be undertaking private musical tuition (path coefficient 0.24) and to come from a family environment that was rich in musical influences (path coefficient 0.39). This is not inconsistent with thoughtful expectations. However, it was notable that a link between class membership and the pre-test scores of musical ability was missing. Again this is consistent with the findings that there was no significant difference between the mean scores of the students from each of the control and experimental classes on the pre-test of musical ability. In contrast, the students' scores on the musical post-test was linked to only two variables – a strong link to the pre-test variable (path coefficient 0.72) and a significant link to class membership. It was to be expected that those who scored well on the music skills pre-test to also perform well on the music skills post-test. This suggests that while factors such as having sound cognitive ability, receipt of musical tuition and coming from a family environment rich in music influenced the final post-test score they did so through the mediation of the students' initial

musical skills. Class membership signified the two different musical treatments. Hence the model suggests that the music program with the recorders played a direct role in developing the additional skills displayed by the members of the experimental class.

Response to Research Question 4

The students in both classes were tested at the beginning and at the end of the 11 week program with the Torrance Test of Creative Thinking. Figure 4.5 shows that not only were the class mean scores on the Torrance Test significantly different at the end of the 11 weeks, but that the change in mean scores between the pre and post Torrance test were significantly different for the students in the two classes. Music certainly could have contributed to the development in creativity of the experimental class. This contribution is supported by the fact that, not only was class membership linked to the Torrance post-test, but pre-existing musical ability (musical skills pre-test) also contributed to the final score on the Torrance post-test (see figure 4.6). Such a finding is consistent with the results of earlier research reported in the literature (Hamann, Bourassa & Alderman, 1991, 1990; Kalmar, 1982; Leibowitz, 1978; Silverman, 1962; Simpson, 1969; Torratus, 1969; Wolff, 1979). However these results do need to be treated with considerable caution, for a teacher who is willing to organise a recorder program for her class may well have innovative programs running in other classes such as creative writing and visual art.

Figure 4.6 indicates that a variety of factors beyond initial musical ability and the recorder program contributed to the final Torrance Test score. Students' maturity and experience (age) and intelligence also played a part. For example cognitive ability was mediated both through the Torrance pre-test and through the initial musical ability and, of the exogenous variables, it had the greatest influence on the post-test score of creativity.

Discussion

Music is a powerful medium which can benefit individuals in their physical, social, mental and personal development. This importance is recognised by the place music is given in Australian curriculum documents and in NSW, music is part of the Creative Arts Syllabus (Board of Studies, 2000) along with drama, dance and visual arts.

Although this importance is recognised in syllabus documents, these documents are open to interpretation and are translated differently into every primary classroom. A few selected select schools promote elite musicians and music programs (Chadwick, 2000). There is also a selection of emerging schools where administrators hold a supportive rationale concerning the importance of music in the classroom (Jones, 2004). However, many music educators emphasise extrinsic education philosophy rather than a balance between extrinsic and intrinsic music education philosophy (Temmerman, 2003). That is, general music appreciation classes for music are often not balanced by the inclusion of sustained music making which can be achieved through performance based instrumental classes. What is more funding and staffing problems mean that music can be reduced to a single 30-minutes lesson per week and very little in the way of equipment.

This study centred around a situation which attempted to provide students with a holistic music education through the blending of general music appreciation and performance based instrumental music learning using the recorder. It meant that students were provided with the balance between performance and appreciation, - between the extrinsic philosophy and the intrinsic view as recommended by Temmerman (2003).

In the experimental class students participated in frequent short sessions of 15 minutes, learning the recorder as a class group, four times per week in addition to the 30 minutes of the regular music appreciation class held with the specialist teacher. The class learning the recorder was therefore exposed to 1½ hours of music class each week opposed to just the token 30 minutes. This program was not affected by a funding problem because recorders are inexpensive to purchase. It was also not challenged by staffing arrangements since it was developed and executed by the regular classroom teacher even though she had limited musical expertise.

The findings of this study highlight the importance of a holistic program where students are able to make real music through the instruction using the recorder and appropriate taped backing. This program created a situation in which students were able to learn superior musical knowledge and skills. The study also revealed that spin-offs from music may occur in other areas as suggested by the increased measures in general creativity. Although this study did not include measures of attitude, it is reasonable to presume that the learning of an instrument with a class groups could well have the potential to improve social attitudes through working as part of a cooperative group. However, it could be argued that the recorder program created a situation in which students were able to take ownership of their musical development and share this journey with others. Through the creation of holistic music education combining general music appreciation with performance based instrumental instruction, students can gain enriched understandings.

Recommendations Arising From the Study

In view of the advantages gained in a mere 11-week period, this study recommends that primary teachers:

1. Communicate with school administrators and parents with the object of persuading them that a holistic music education is beneficial.
2. In conjunction with parents and school administrators, choose a suitable instrument and determine the means of funding this instrument so that each student in the class is provided with the instrument.
3. Mapping out a program to teach instrumental skills in regular short sessions each week.
4. Organise regular 'concerts', open to parents and other students, where young musicians can share their skill and enjoyment with others.

Limitations

The results above need to be treated with considerable caution for the following reasons:

I. Absence of a Discussion of Attitude

The major limitation of this study is the absence of any discussion of student attitudes towards the two musical programs. Researchers emphasise the importance of attitudes in the formation of motivation and hence its influence on the achievement of success (Cutietta, 1992). A measure of attitude could be introduced as an endogenous variable in the exploratory model.

II. Limited to One Setting

Although the study has considered a hypothetical generalisation of the results, it must be remembered that this study was limited to only one setting. It centred on the development of one

musical program conducted by the general classroom teacher, using the recorder for 15-minutes, four times per week, for a year-five class in a single independent school. What is more, in this study males were under-represented within both classes.

III. Specificity of Music Tests

The researcher developed music tests have not been used in any other study and do not assess all musical concepts. The validity of these tests needs to be established.

IV. Questions about the Torrance Test

Although the Torrance Test of Creative Thinking is promoted as a reliable and valid test (Hickey, 2002; Kerr & Gagliardi, 2001), many researchers of creativity promote the use of checklists or 'real life' assessments analysing a creative work, such as a musical composition, rather than the use of divergent thinking tests (Hickey, 2002). In view of this controversy, the findings of this study are more a curiosity then a reality and further investigation in this area is recommended.

V. Failure to Meet the Requirements of Path Analysis

The path analysis was exploratory and only undertaken in order to increase the statistical experience of the researcher. This study failed to meet the usual requirements of path analysis in the following ways:

(a) The model was not explicitly developed from the literature.

(b) A ratio of 20 cases to each variable employed in the model was not achieved.

(c) The use of goodness to fit tests for the path model were not employed.

The interpretation of findings contained in this thesis needs to be made within the context of the limitations just outlined.

Recommendations for Further Research

Taking into account the results of this study and its limitations, the following recommendations can be made:

- A carefully researched and constructed study with more precise controls needs to be undertaken with more students in a variety of schools and class groups. This further study should also examine the role of attitudes towards music and music programs.
- An investigation needs to occur into the frequency and length of primary school music programs in relation to the development of musical skills and knowledge. In this study, the experimental class experienced 1½ hours of music per week compared with the control class who only had the weekly 30 minutes. The additional sessions were short and frequent.
- Further research needs to be undertaken on the possible connections between music and creativity and factors which influence creative development.

Conclusion

This study has shown that a musical program employing the recorder with a general classroom teacher could significantly improve students' musical knowledge and skills and those regular, short sessions of music-making with a single instrument can provide significant benefit. It is the hope of the researcher that this study may provoke further research into the importance and characteristics of a music program that provides real benefits to primary school students.

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Appendix I

Student permission letter

Date.

Dear [Parent],

Your child's class has been chosen to participate in a study examining the development of musical skills and linking creative ability and school music. This will involve three short tests measuring musical, spatial and creative ability. The musical programs are independent of this study and will continue even if the study does not take place.

I would like to invite your child to participate in this study, as they are a member of the class participating in the research. Participation in this study is purely voluntary and this letter places your child under no obligation whatsoever. Furthermore, you are free to withdraw your child from the study at any time, should you desire. The data gathered will be used collectively and no individual score will be made known to anyone outside the study.

This study is part of the Avondale College honours program and is under the supervision of Cedric Greive. Should you have any questions about the study feel free to contact the class teachers, --------, ----------, Mr Greive (phone ------) or myself (--------). Should you have any complaint about the study once it commences you can contact the HREC Secretary, Avondale College, PO Box19, Cooranbong, NSW, 2265 or phone (02) 4980 2161 or fax (02) 4980 2190.

This research project has been approved by the Avondale College Human Research Ethics Committee (HREC). Avondale College requires that all participants are informed that if they have any complaint concerning the manner in which a research project is conducted it may be given to the researcher, or if an independent person is preferred, to the College's HREC Secretary, Avondale College, PO Box19, Cooranbong, NSW, 2265 or phone (02) 4980 2161 or fax (02) 4980 2190.

I believe this study is important for it may provide teachers with additional information about teaching methods and I do invite your interest and your child's participation.

Thank you for your time,
Yours Sincerely

Sussan Croker — *Honours Researcher*

Cedric Greive — *Honours Research Supervisor*

I give permission for my son/daughter _____ class _____ to participate in a term one study which examines the development of musical skills and the potential relationship between classroom music programs and the development of creativity.

Signed _____

Date _____

Appendix II

Student interview questions

Christian Name and Initial:_____ **Gender: M F**
Class: Experimental Control **Age in Years:**
Date: _____ **Time:** _____

Question	Comments
Student Instrumental Abilities	
Do you play an instrument?	
What instrument do you play?	
How long have you played for?	
Do you still have lessons?	
Do you play in a band or orchestra?	
Family Background	
Do any members of your family plan an instrument?	
Who are they and what do they play?	
How long have they played for?	
Do they play in an orchestra or band?	
How often do you attend their performances?	
School Music	
Do you like music class at school? Why?	
Have you learnt the recorder before?	

Appendix III

Musical skills test

Christian Name and Initial:_____ **Gender: M F**
Class: Experimental Control **Age in Years:**
Date: _____ **Time:** _____

Pre-test **Post-test**

Individual Flash Card Ability Task	**1**	**2**	**3**	**4**	**5**	**Score**
Read treble clef notes						/5
Read bass clef notes						/5
How many beats are these notes worth?						/5
Do they have a special name? What is it?						/5

Repeat a rhythmic pattern	*Number of Bars Correct* _____
Clap written rhythmic pattern (from notation)	*Unsatisfactory/Satisfactory/Commendable*
Conduct in simple triple time to music	*Attempts? Y/N* *On the Beat? Y/N* *Identifies Strong Beat? Y/N*

Rhythmic Pattern to Echo-Clap –

Notation of Rhythmic Pattern –

Appendix IV

Second musical test administered at the conclusion of the study

Christian Name and Initial:_____ **Gender: M F**
Class: Experimental Control **Age in Years:**
Date: _____ **Time:** _____

Direction/Question	Criteria	Score
Point to the time signature	*Identify? Y/N*	
What does the time signature do?	*Unsatisfactory/Satisfactory/Commendable*	
What does the dots and double bar lines mean at the end of the piece?	*Unsatisfactory/Satisfactory/Commendable*	
Point to a tie note	Identify? Y/N	
What is a tie note?	*Unsatisfactory/Satisfactory/Commendable*	

These questions were asked in relation to the sheet music for 'She'll Be Coming Round the Mountain' (contained in Leask, 1995).

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