Methods of Band Instrument Selection and their Validity as Indicators of Successful Learning Outcomes.

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Statement of Authenticity

The original work contained herein is that of Philippa Robinson and has not previously been submitted for an award at any other higher education institution. To the best of my knowledge and belief, no material previously published or written has been included except where due reference has been given.

Philippa Robinson

9 August 2011
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Abstract

This research examines the process of musical instrument selection. The decision-making processes, the methods available to aid teachers, students and parents in these processes, and their validity as indicators of successful learning outcomes have been studied. This research aims to extend the existing body of knowledge on methods of instrument selection, and to broaden the scholarship of this field by closely examining the outcomes that they produce.

Choosing to study a musical instrument and deciding which one to play are decisions that face many thousands of Australian primary school students, parents and teachers every year. The range of pre-existing knowledge available to aid this process will vary markedly from family to family and school to school. Many families will have some musical knowledge and background, some will be aware of literature to access and of institutions that offer advice, and others will have little or no idea where to begin their search.

The initial decision of whether or not to begin learning a musical instrument might seem straightforward, but this can be influenced by a range of different factors and circumstances. In a school environment, some of these contributing factors can often lie outside the control of parents, students and even the instrumental music teachers. The decision regarding which instrument to choose can be a complicated and confusing process and whilst there are various methods available to aid these decisions, their validity has not been fully investigated or tested in terms of accurately predicting learning outcomes.
“Methods of suitability testing and instrument selection” refer to the systems, processes or practices that are currently used, principally in primary schools, as a means of both suitability testing for the placement of students in instrumental music programs, and to help select appropriate band instruments for them to subsequently study.

The ultimate goal of this research is the development of an optimal testing method or combination of methods that will accurately predict which students will be musically successful, and on which instruments. It is also a desired aim that the developed method be of substantial value in terms of implementation in a primary school setting.
Key Words

academic ability; aural skills; concert band instruments; Gordon test; instrument immersion program; literacy testing; musical aptitude; numeracy testing; pitch recognition; rhythmic skills; timbre preference
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To my brother Lloyd Robinson whose engineering skills secured my studio and gave me a place to work in the aftermath of the January 2011 floods. Finally to all the amazing people who volunteered during the Queensland floods, especially those who helped clean our house and salvage some belongings. To those who shovelled thick mud for days in our lounge room or who brought food and water and provided accommodation—although I will never know all of your names, I will never forget the strength and support you provided.
Foreword

Choosing the wrong instrument was the most common factor in music failure—not lack of musicality, or musical potential. (Ben-Tovim and Boyd 1985)

Although this statement was made in relation to research conducted over 20 years ago, it still resonates truthfully and is just as relevant in the area of instrumental study today. Starting on the “wrong” or at least an unsuitable instrument would still appear to be one of the major causes of dropout rates for students studying instrumental music. Finding better methods of instrument selection in schools is much needed, to decrease the dropout rate and increase the success rate for students studying instrumental music.

By examining the most commonly employed methods of instrument selection and the validity of each one in terms of successful outcomes, this study aims to identify the best method or combination of methods for selecting suitable instruments. Using essentially a triangulation research approach, this study will focus on the decision-making processes, the methods available to aid teachers, students and parents in these processes, the rationale behind them and most importantly, their validity as indicators of successful learning outcomes for the students. The intention is to find an optimal testing method that will accurately predict which students will be successful and on which instruments.

The testing methods and processes being examined in this study include academic ability, aural skills, timbre preference, student choice and an instrumental immersion program.
The central question underpinning the study is: which method of instrument selection will return the highest proportion of successful outcomes? Each method being examined will raise a number of sub-questions that are yet to be addressed in terms of outcomes in existing studies published to date. The broad questions raised in relation to these methods will include:

Do academic results (high or low) have an influence on musical achievement?

How important is pre-existing aural and rhythmic skills in the study of instrumental music?

Will timbre preference, as perceived by the students, impact on their instrumental results?

Will students perform better on their own preferred choices of instruments?

Does a “trial and error” approach have merit in a school setting?

The instruments offered to the students in this study are those of a standard beginner primary school concert band; that is flute, clarinet, saxophone, trumpet, trombone and percussion.

The word “success”, particularly in a primary educational setting, can have quite differing amounts of significance and meaning from one student, teacher or situation to another. For the purpose of this study a “successful learning outcome” will be defined as being higher than a pass grading (which in current reporting trends is a “C”); that is, either a credit, “B” or a distinction, “A”. Whilst it could certainly be argued that an average or pass result could be regarded as successful for many students, this study will primarily focus on the higher results. It should also be noted that from 2010, it is a
government requirement for A to E reporting in all Queensland schools, with A being the highest result.
Chapter 1: Foundation, Context and Researcher Perspectives

Initial interest in this research project grew from many years of teaching instrumental music to primary, secondary and tertiary students. In my current position as Head of Instrumental Music at an independent co-educational college, (Kindergarten to Year 12) I found myself in a position to be able to conduct some searching, detailed and original research in this area.

Currently, my position includes the coordination of an instrumental music program that forms part of the core-curriculum and is therefore undertaken by all students for a three-year period in Year 5 through to the completion of Year 7. Around 200 students between the ages of 9–12 take part in this program, with approximately 25% of Year 7 students filtering each year into an elective instrumental music program which runs from Years 8 through to 12 (the final year of secondary schooling in Australia).

A number of independent (non-government) schools currently run a compulsory instrumental music program for between one and three years. These programs usually commence in Years 5 or 6, and always in the late primary (currently to Year 7) or early secondary (from Year 8) years, now commonly referred to as middle schooling. It is generally accepted that this is the best time to begin the study of a band instrument, particularly woodwind and brass instruments, as the students are of a suitable body size to manage the physical requirements.
Students who have been in attendance at the school where this research was conducted, have since their preparatory year (pre-school) had two 30-minute lessons of classroom music per week. In addition to this, in Years 3 and 4 all students will have been involved in a class string program on either violin or cello. In Year 5, where the majority of this research is concentrated, students take part in a band immersion program in which three different instruments are studied over a one-year period. As would be expected in most school situations, a small number of students begin the programs at varying stages or entry points, and a small number of students had previously engaged in private music lessons on piano, guitar or voice outside the school setting.

It has been my experience that students will choose to play a particular instrument for a variety of reasons, ranging from the relatively sensible through to the illogical. Peer or parental pressure, and traditional gender associations with particular instruments, are all factors that can play a major part in the instrument choices of students in this age group. Some of these decisions can be largely attributed to a lack of knowledge on musical instruments, as well as underdeveloped reasoning skills and limited maturity levels in a primary school age group.

Based on my observations in my current teaching position, I believe that students, parents and teachers would be better served through the study, refinement, integration and further development of the methods which are available in the instrument selection process. This research will add substantially to the knowledge base in this field, by investigating the current and most used range of testing procedures, and providing insight and practical information on the most effective and valid methods of selecting
suitable instruments for primary aged students. By closely monitoring the progress and learning outcomes of a large group of students, this study will provide information that can act as a practical guide or program in band instrument selection for primary students.

Evidence for the gap that can be apparent between testing methods and real outcomes can be found in the literature and is exemplified here by Sloboda:

Over the past thirty years, relations between educational psychologists and cognitive psychologists have not always been cordial. Cognitive psychologists have viewed educationalists as unconcerned with understanding the psychological mechanisms which account for the success or failure of particular training methods. They have caricatured the typical educational study as randomly allocating children to a number of different types of instructional regime and simply prescribing the instruction which gave the best results. On the other hand educational psychologists have seen cognitive psychologists as unconcerned with solving practical problems, and have caricatured the typical cognitive study as dealing with some microscopic portion of a real task … (Sloboda 1985)

This study will monitor the progress of two consecutive cohorts of students over a three-year period in a practical school setting. Cohort Two will be tested one year after Cohort One. The cohorts of students will be monitored from the beginning of Grade 5 through to the end of Grade 7. The quantitative data gathered from the monitoring and recording of student progress will be evaluated in light of result-based outcomes using authentic, criteria-based assessment processes. In addition, this study will also gather and report on qualitative data gathered by surveying students, parents and teachers. The literature relating to this study is quite specific to each of the testing methods. In light of this, it will be interwoven in each chapter as the methods are examined individually.
A Survey of the Literature

Existing literature relating to musical instrument selection can be assembled into four main categories as follows:

1. Guides and manuals aimed at parents.
2. Educational and teaching resources.
3. Smaller studies and articles in the form of journal publications.
4. Substantial literature/texts of an academic or scientific nature.

Within these categories there are sub-divisions as well as some overlap of information and themes. The literature will also be referred to throughout this study as it specifically relates to the methods of instrument selection being examined in each chapter.

The literature in the first identified category can be neatly divided into two sub-categories. The first being books that resemble a musical instrument “dictionary”. Ben-Tovim and Boyd’s *The Right Instrument For Your Child* (1985) and Crozier’s *Musical Instruments for Children* (2007) are both examples of this. These books offer a range of advice on each instrument, including suggestions about appropriate starting age, physical and mental suitability, as well as cost and opportunities associated with particular instruments, such as bands and orchestras. These resources also provide simple tests that parents can administer with a view to detecting readiness in their children for beginning a musical instrument. These tests are designed for a home environment, and do not require any prior musical knowledge (see Figure 3, p.51). Due to the huge popularity of the Ben-Tovim and Boyd book, this resource can almost be
regarded as a method of instrument selection in itself and is therefore referred to extensively in some sections of this research.

In the second sub-category is literature that is aimed at a more educated, but not necessarily musically educated, body of parents. These books include: Crease’s *Guide Your Child to Play a Musical Instrument (And Enjoy It!)* (2006), Curietta’s *Raising Musical Kids: A Guide for Parents* (2001), Haroutounian’s *Kindling the Spark* (2002) and Turner’s *Your Musical Child* (2004). Whilst this body of literature does offer sections of instrument specific information, these authors adopt a more holistic approach to music instruction in general, and give more insight and in-depth information on wider issues surrounding instrumental learning.

In the category encompassing music/arts education and teaching resources, authors who devote a chapter or smaller section of a book to various aspects of musical instrument selection or learning include: Fowler (1996), Richardson (2002), Green (2008), and Jorgensen (1997, 2008). There have been numerous smaller studies published in a variety of educational journals that investigate specific areas relating to instrumental music study. These studies examine areas including: gender, musical and academic aptitude, instrument preference and timbre.

Research undertaken on musical aptitude, including pitch discrimination and rhythmic skills includes: Geringer (1983), Krumhansl (1990), Haroutounian (2002), and Guerrini (2004). With specific reference to band instruments, Madsen (1984) compared the pitch and tempo discrimination between wind and percussion players. A broader approach
adopted by Schneider (2004) investigated factors that affect the measurement of rhythmic achievement.

Gordon’s *Manual for the Instrument Timbre Preference Test* (1984), was the catalyst for a number of subsequent studies, including his own study of the characteristics of this test in 1991. Lewis undertook a validation study of Gordon’s Instrument Timbre Preference Test in 1998. Weaver (1987) investigated relationships between preferences for natural and synthesized sounds. Other studies relating to timbre preference include Kelly (1997), and Kuhlman (2008) who both compared timbre preference and gender. Preceding the Gordon Test were studies including Madsen (1976), and Geringer (1981) that compared tone quality and intonation. Other authors who advocate timbre as an important learning element include: Turner (2004), Zdzinski (2004) and Green (2008). It should be noted that the Gordon Test is the only timbre preference test developed to date that is designed to be implemented in a primary school setting.

Endeavours to find relationships between academic and musical aptitude have resulted in a large body of research. This research takes a variety of different cause and effect approaches to examine a range of benefits brought about by the study of a musical instrument. Areas of investigation include cognitive abilities, literacy and numeracy skills, academic achievement in general, social skills and self-esteem. This is an area where there has been considerable shift and variation in research findings over the past eight decades.

Seashore (1938), Mainwaring (1947), and Ludin (1953) are examples of researchers who advocated pre-existing musical ability as necessary for success in the study of a musical instrument. In 1955 Garder undertook a project that examined the characteristics of outstanding high school musicians. In the 1960’s Suzuki’s pioneering work paved the way for a more liberal school of thought, where the idea of musical aptitude being a developmental process became popular. Following from this was another large body of research advocating musical instruction as a means of improving academic achievement. In 1976 Madsen compared music lessons with free play time in relation to academic achievement. Other writers in this category include: Horner (1965), Young (1971), Hurwitz (1975), Lamb (1993), Colwell (1996), Cope (1997, 1998), Costa-Giomi (1997), Cutietta (1995), Phillips (1997), and Geringer (1980).

In the fourth identified category, is literature that approaches aspects of musical study and musical abilities from an academic or scientific perspective. This body of literature explores the psychology relating to musical temperament, and the acquisition of musical skills. Included in this category are the writings of Sloboda (1985), Krumhansl
(1990), Kemp (1996), Levitin (2007), and Patel (2008). Broader investigations of the reasoning or psychology behind the process of studying a musical instrument have been conducted by Sloboda (1992), Bayley (2000), Zdzinski (2004), and Watt (2008) who was concerned with equity and access in music education.

Other writings that do not specifically relate to musical study have also been consulted during the course of this study. This was principally for the purpose of gaining a better understanding of the thought processes and reasoning skills present in the specific age group of the participants in this study. These resources included: Suzuki (1969), Whitmore (1980), Carr-Greg (2006), De Botton (2004), Nagel (2005), and Metcalfe (2005).

**Method**

The methods being examined in this study have been chosen because they are commonly and currently used in primary schools across Australia. Each method will be examined individually in terms of its reliability as a predictor of successful instrumental results. The available literature on each method has also be examined and interwoven with the findings in each chapter. Where appropriate, many of the findings relating to each method has been presented as numerical data. These methods are:

- academic ability
- musical aptitude - aural and rhythmic skills test
- timbre preference test (The Gordon Test)
- student choice
- instrument immersion program
The following Concept Diagram (Figure 1) maps the research stages employed in this project. Through this path it is intended to identify the best practice in instrument selection.

Figure 1: Concept Diagram
Academic ability will be examined foremost for two principal reasons, firstly because it is one of the most frequently employed methods of selecting students for instrumental music programs, and secondly because this type of data was readily available in relation to each of the participants at the commencement of this study. The focus here is to determine what impact academic achievement has on instrumental music study, and whether it is reasonable to include or exclude students from such programs based solely on academic achievement.

An aural and rhythmic skills, or musical aptitude test, was administered to all students before they commenced the program. This type of testing is also frequently used in school music programs and other institutions to measure existing musical ability or to gauge musical potential.

Like academic ability, perceived musical aptitude is frequently used to determine which students are offered places in instrumental music programs. The main focus in this chapter will be to determine the validity of this kind of testing in relation to instrumental results. Both Kemp and Sloboda have identified flaws in this kind of testing and have recognised a need for further research:

The main problem courted by such research, which adopts music ability test data as the independent variable, is that such tests do not set out to measure actual real-life musical achievement. (Kemp 1996)

Work on the assessment of musical ability has not been a major concern of recent research within the cognitive tradition. By and large there is too little clarity concerning what precise cognitive skills are being tapped by many ability tests, and predictive validity is generally low. (Sloboda 1985)
This section of the study will determine whether musical aptitude in pitch and rhythm is a necessary pre-requisite for achieving success in instrumental study. It will also examine the relationships between aural skills and instrumental success.

Timbre preference testing (The Gordon Test) was administered to both cohorts of students prior to commencing an instrument. In order to gauge the effectiveness of this method as an indicator of successful outcomes, the data gathered pertaining to timbre preference was aligned with the instrumental results. Questions in this chapter will focus on whether timbre preferences or dislikes have any relationship to consequent achievements in a practical setting.

Alongside established testing methods, it is equally important for this study to investigate outcomes in a situation where essentially no particular method is used, i.e. free choice. It is appropriate to consider the possibility that students may perform better on an instrument of their own choosing. All the students therefore studied their first choice of instrument for one term, enabling the results to be compared with other methods.

Through the course of a three-term instrument immersion program, the students studied three instruments, one per school term. One instrument was their own choice, one their highest timbre preference and the third represented a different instrument family, where applicable, for example, in cases where a student had chosen flute and their timbre preference was clarinet, they were encouraged to trial percussion or a brass instrument.
At the conclusion of the immersion program the students, with the help of instrumental music staff, decided upon an instrument for the remaining fourth term, and continued with this instrument for a further two years. The instrumental music teachers completed one section of a student profile form (Figure 2) after each trial period. The study then continued to track the progress of both cohorts (127 students in total) over this three-year period.

### Year 5 Term Rotation Band Program

<table>
<thead>
<tr>
<th>Instrument (Term I)</th>
<th>Teacher</th>
</tr>
</thead>
<tbody>
<tr>
<td>Suitability (A-E)</td>
<td>Additional Comments</td>
</tr>
<tr>
<td>Effort (A-E)</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Instrument (Term II)</th>
<th>Teacher</th>
</tr>
</thead>
<tbody>
<tr>
<td>Suitability (A-E)</td>
<td>Additional Comments</td>
</tr>
<tr>
<td>Effort (A-E)</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Instrument (Term III)</th>
<th>Teacher</th>
</tr>
</thead>
<tbody>
<tr>
<td>Suitability (A-E)</td>
<td>Additional Comments</td>
</tr>
<tr>
<td>Effort (A-E)</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Suitability Grading Codes</th>
<th>Effort Grading Codes</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Always did the correct equipment at lessons. Shows evidence of regular practice.</td>
</tr>
<tr>
<td>B</td>
<td>Rarely missed any equipment at lessons. Practice is evident.</td>
</tr>
<tr>
<td>C</td>
<td>Some inconsistencies in bringing equipment and practice.</td>
</tr>
<tr>
<td>D</td>
<td>Often missing equipment, very little evidence of practice.</td>
</tr>
<tr>
<td>E</td>
<td>Often missing equipment, no evidence of practice, poor attitude.</td>
</tr>
</tbody>
</table>

Recommended Instrument: ________________________

Signed ________________________ (Head of Instrumental Music)

---

Figure 2: Student Profile Form (blank)
Specialist instrumental teachers, who are employed on a permanent basis by the college, staffed this program. This is important in that it enables the students to hear the instruments played at a professional level. It is my experience that in a school setting, employing instrumental music teachers on a permanent basis, results in a stronger level of commitment and consistency which ultimately leads to better quality teaching and learning outcomes. The 30 minute lessons for this program took place on the same day each week and in the one facility, giving the best possible opportunity for professional interaction between staff.

The teachers were not specifically made aware of each student’s academic results, musical aptitude test results, timbre preference or first choice of instrument. Specific grading criteria and detailed descriptors were supplied to each teacher in the form of a purpose designed student profile sheet. (Figure 2) These were completed at the conclusion of each term. As the program progressed, these results (combining suitability and effort ratings) were compiled to form a personalised profile on each student. The completed profile was used to assist in the selection of a final choice of instrument.
Summary

Where this study differs markedly from existing studies is firstly in the variety of different testing methods used on the same participants, and more importantly in the close examination of each method in relation to successful learning outcomes. Another important discernable difference lies in the all-inclusive nature of the instrumental music program where every child, regardless of their perceived abilities or aptitude, is given the chance to explore a variety of instruments.

It is anticipated that this research will considerably extend the body of existing knowledge in this field, by identifying the method or methods that will more accurately predict successful learning outcomes in instrumental music.

Ethical clearance has been granted for this study (GU Ref No: QCM/02/05/HREC) which has included the distribution and collection of permission forms signed by the parents/guardians of all student participants. This research has also been strongly supported by the instrumental music teachers and from management level at the college.
Chapter 2: Study A- Academic Ability

As an indicator of success in the study of a musical instrument
Background and Rationale

By examining the relationships and links between academic ability and musical ability, this chapter explores the idea of academic ability being a reliable predictor for producing a successful outcome on a musical instrument. More specifically, it will aim to interrogate the concept that pre-existing academic ability might be a dependable and consistent way of predicting student success on a musical instrument. This approach finds support in the literature:

Humans appear far more uniform in their linguistic than in their musical abilities. Although some normal people are certainly more fluent speakers or have keener ears for speech than do others, these variations seem minor compared to the range of musical abilities in normal people. Of course, empirical data on variation in abilities within both domains is needed to make a fair comparison. (Patel, 2008)

In order to establish the credibility of using existing academic achievement as a reliable indicator of musical success, the academic levels of each student in the two participating cohorts were recorded before commencing the instrumental music program. For interest, their academic results were then re-recorded after one year of musical study, and then again after two years of instrumental study. The fact that all students were studying a musical instrument, regardless of their existing academic levels, provided substantial data suitable for addressing a range of questions associated with the relationships between academic and musical ability. This section of the study was primarily focussed on determining whether high academic results equated to high instrumental results. It should be stressed that this study was not concerned with changes in academic standards resulting from instrumental study and as such, it was not considered necessary to involve a control group.
As evidenced in the literature cited below, the relationship between general intelligence and musical ability has a long history. Existing studies generally fall into three categories: studies which find that intellectual ability is necessary to achieve musical success, those who state that musical ability is a completely separate intelligence, and more recent studies which suggest studying music will increase general intelligence.

Schoen (1940), Horner (1965) and Cleak (1970) insist that intellectual capacity and intelligence is essential for musical success. Others such as Beinstock (1942), Lundin (1953), and Holmstrom (1969) go so far as to suggest that intelligence tests are better at predicting successful musical outcomes than are actual musical aptitude tests themselves. Seashore (1938) was an early advocate of musical ability being a “special” ability, and unrelated to other factors stated that “intelligence may characterise or set limits” for musical achievement. Similarly, Mainwaring (1947) believed musical ability was a specific intelligence. Psychologist John Sloboda (1994) has written extensively on this topic and believes that musical ability can be developed given the right encouragement, exposure and opportunity whilst also carefully acknowledging that some foundation or interest should be present:

Musical skill is acquired through interaction with a musical environment. It consists in the execution of some culturally specific action with respect to musical sounds. However, musical skill is constructed from a base of innate abilities and tendencies. Every human advance involves building on what is already present. (Sloboda, 1985)

Also of this view was Dr Shinichi Suzuki, who firmly believed that every child could develop musical ability with encouragement, support and exposure:

A child’s ability to develop is proved by being developed. (Suzuki, 1969)

Both Mursell (1937) and Farnsworth (1958) suggest that correlations between intelligence tests and scores in musical tests are low although also stated that musical ability is found to be positively associated with intelligence.
This literature supports the common practice in public primary schools, namely selection of students for instrumental music programs has been largely based on academic results. The belief here is that students with above average academic ability will also perform well on a musical instrument. It would therefore stand to reason that the same school of thinking would dictate that students who are only average or below average academically might struggle to achieve a successful outcome on a musical instrument.

It is also generally accepted in schools that academically bright students will have no trouble catching up on class work missed whilst attending an instrumental music lesson whilst students who under-achieve academically would probably find this more difficult. Instrumental Music teachers in Queensland who are employed by the Department of Education give lessons during normal school hours. Before and after school times are usually reserved for ensemble rehearsals and tutorials. This situation is also very similar in the private school sector. As a result of this, a large percentage of the instrumental instruction in schools takes place during “curriculum time”. This can result in academically average or below average students missing out on the opportunity to begin the study of a musical instrument within the school setting. Sergeant expresses this sentiment very clearly:

Teachers of music now frequently question the validity of even attempting to inculcate such skills in groups of children of low general ability. (Sergeant, 1974)

Unsurprisingly, there are always those parents who will seek musical instruction for their children outside of school hours and at their own expense; however, this is often financially unviable for many, or simply falls outside of family priorities.
Throughout the author’s 20 years of experience in teaching instrumental music in both government and independent schools, students who appear to struggle with achieving the academic expectations of their year levels are not often given the opportunity to study a musical instrument in the school environment. The author has witnessed firsthand many cases where students who show signs of struggling academically are actively encouraged, or even forced, sometimes by parents and also by teachers, to cease the study of a musical instrument. Keeping under-achieving students in academic classes or thinking a musical instrument might be too much to manage seems logical enough on the surface, but this approach may be quite unfounded, and there is no evidence to suggest that this is the case.

There is an ever-growing body of research which tells us that learning to play a musical instrument will in fact be notably beneficial to academic ability levels. Haroutounian acknowledges these academic connections as well as identifying other areas which may be positively influenced through the study of instrumental music:

Ongoing studies have connected the study of music with reading, language skills, mathematics, general creativity, and social concerns such as self-esteem, social skills and reduction of dropout rates. (Haroutounian, 2002)

The past three decades has seen the emergence of a considerable amount of this type of research, particularly from the United States, which looks at the academic abilities of children who study musical instruments. In short, the majority of this research states that playing a musical instrument will make the learner “smarter”. By drawing on comparisons between the academic ability (with particular emphasis on literacy and numeracy) of students in relation to their musical ability, this existing research sets out to prove that studying a musical instrument will result in higher levels of academic achievement. Much of this research seems to focus on establishing some kind of
correlation or link between academic and musical ability, and aims to measure how one might potentially influence or affect the other. Many reports suggest that learning a musical instrument will enhance or contribute greatly to a child’s learning in other areas and have gone so far as to report that non-musicians make fewer academic observations than students who study a musical instrument. Recent examples in the literature include:

Musicians have been found to possess larger planum temporale and thicker corpus callosum in the brain because their musical mental ability has been developed. If they had not had musical exposure and training, this area would have been neglected and thus underdeveloped. (Cutietta, 2001)

Music may be the activity that prepared our pre-human ancestors for speech communication and for the very cognitive, representational flexibility necessary to become humans. Singing and instrumental activities might have helped our species to refine motor skills … (Levitin, 2007)

The performing arts assist in language acquisition and learning; sporting activity in younger children assists in the development of literary skills. (Metcalf, 2006)

Other extra-musical benefits include a better attention span, sharper focus, and increased memory retention—in other words they are all life skills that will be valuable to your child every day. Kids who focus on music focus more efficiently in other areas. (Crease, 2006)

With the public attention brought by “Music Makes You Smarter” research, many parents are interested in providing their children with appropriate musical experiences. This research was led by Frances Rauscher, a psychologist at the University of Wisconsin at Oshkosh and Gordon Shaw, a physicist at the University of California at Irvine, and published in the February 1997 issue of Neurological Research. Zdzinski and Crease specifically identify mathematics as an area that may be enhanced as a result of musical study:

Studies that show that music training generates the neural connections used for abstract reasoning, including those necessary for understanding mathematical concepts. (Zdzinski, 2004)
Students from countries that place a high value on classical music, music education, and artistic accomplishment—such as Hungary, the Netherlands and Japan—continue to have the highest scores on international math achievement tests. All three countries keep music as part of the core curriculum and provide musical instruction, both instrumental and vocal, from elementary and middle school through high school. (Crease, 2006)

As well as numeracy, Chester also includes literacy as an area that would appear to improve as a result of studying music:

A new study proves children and teens who study music do better in maths and reading at school … kids who have music lessons or attend concerts with parents are more likely to be academic high achievers, with that boost in school performance tending to come after they start to study music. (Chester, 2009)

Cutietta and Crozier adopt a broader, more holistic approach when referring to the benefits of studying music:

Mental development is clearly enhanced by studying music, but not necessarily in the simplistic way that results in higher SAT (Scholastic Aptitude Test) scores or math grades. Current theories of intelligence take into account the multifaceted and overlapping skills the brain is capable of managing simultaneously. For example, the theories of Howard Gardner are becoming widely accepted as a view of intelligence that is measured by more, much more, than the traditional view of math and reading ability. (Cutietta, 2001)

There is substantial evidence to show that participating in music-making, no matter how briefly, helps develop a range of positive and transferable skills, including cooperation, concentration, listening, coordination and fine motor skills; it even helps establish friendship groups. Learning an instrument encourages children to develop across all learning styles as they read and obey instructions, write examination answers and respond to visual signals. (Crozier, 2007)

In order to establish the validity and credibility of this type of research, it is important to gain some insight into how the majority of the participants in these studies came to be playing instruments in the first place. For decades it has been common practice to choose students for instrumental music programs who display superior language and/or mathematical skills. The idea that these students are more likely to have success on a musical instrument, as opposed to those who are not as academically capable, is still popular and common thinking:
General music classes in elementary schools are geared for all students, but string, orchestra, and band programs were only offered in about one third of schools surveyed, and even then they’re typically offered only to students in grade four and up, as an elective, and on a limited basis … The result? A void in music instruction, which nurtures other aspects of learning such as physical coordination, cognitive development, and cultural literacy. (Crease, 2006)

From discussions with numerous primary instrumental music teachers it is apparent that in many Australian schools, places in instrumental music programs are offered on a selective basis—in other words, they are offered only to those students who display at least an above average (or B level) of academic proficiency. It is this level of academic proficiency which is seen as a prerequisite, before any sort of musical testing is even considered to be offered. In light of this, it would therefore be reasonable to suggest that the students referred to in many studies and surveys are playing instruments because they were already considered academically proficient. Simply comparing students who do and do not play musical instruments is not in reality a valid comparison for suggesting that studying a musical instrument increases academic intelligence.

Existing studies relating to the academic achievements of music students may not be as valid as they could or should be, due to problems with the selection of the participants. In some cases they have been given the opportunity to play an instrument because of existing academic abilities and achievements. The argument that such students would achieve highly without the added dimension of instrumental music study is certainly a valid one. In this context it is very difficult to gauge whether the study of a musical instrument has any major impact on academic achievement. Even if a student’s academic ability is measured in some way before commencing the study of a musical instrument and continually monitored over a period of time, how can we accurately measure what difference the musical instruction might have made? Cutietta finds an appealing way of explaining this dilemma using a non-musical comparison:
Almost all the research conducted with standardised test scores looks at correlations or relationships between studying music and something else. For example, folklore has it that people who drive red cars get more speeding tickets. This is called a correlation and may in fact be true. Explaining correlations is usually at best a guess. The red car drivers say the correlation exists because the police are out to get drivers in red cars. A far more likely explanation would be that people who drive fast are attracted to (and thus own) red cars. A third, but less likely, explanation is that red cars make a person drive faster. The truth is we have no way of knowing which of the three possible explanations is the reason for the correlation. (Cutietta, 2001)

It may well be accurate that students who study musical instruments do perform better academically than those students who do not. The difficulty lies in trying to explain this phenomenon. Another reason for hearing so much about this type of research is that musical instrument instruction is often seen as a peripheral activity, rather than as part of the core-curriculum. In addition, teachers are often forced to advocate for their programs. It is largely due to the rather unsubstantiated or tenuous nature of such studies that has drawn much criticism from the viewpoint of scientific researchers and some educational bodies. The lack of tangible evidence in this area has been a particularly prevalent point in discussions relating to the financial side of justification for music programs. When faced with financial cuts, or the threat of losing a program altogether, it is not unexpected that teachers would draw on the research which promotes instrumental music as a tool for increasing academic results. Using the research in this way only justifies instrumental programs for their add-on benefits rather than promoting them as a worthy area of study in their own right. Cutietta makes a strong argument for music instruction to stand alone as an area that is equally as valid as others in an education system.

The clear reason we study music is to develop our musical intelligence as an equal component of our overall intelligence. It is only when all aspects of our mental ability are developed that we are truly intelligent. In that way, studying music makes us smarter. In that way since the areas overlap, studying music helps us with non-musical skills. (Cutietta, 2001)

In the face of a potential budget cut, a paper presented at the Scottish Educational Research Association Annual Conference (September 18–20, 1997; University of
Dundee) was aimed at raising the general awareness of the wider educational benefits of learning a musical instrument. At the time, the provision of instrumental music tuition was under review by local educational authorities, and sadly there was very limited local research in this area to support their cause. One reason cited for this was that the data gathered was not viewed as a reliable indicator as it would be in other subject areas, because not all students undertake study in this area. Further evidence concerning the apparent confusion surrounding studies that attempt to draw comparisons between musical and academic achievement is supported below:

So why do we hear about this improved academic achievement so often? The problem lies in the fact that the studies previously described, which are seemingly finding true differences, are reported in the same articles, often in the same sentence, with the results of another avenue of research. For example, after stating that studying music makes a section of the brain larger, the articles often report as further evidence that children who study music have higher SAT scores. These two “facts” sound logical together, but actually have little to do with one another. (Cutietta, 2001)

Using academic ability as a means of selecting students for instrumental music programs will undoubtedly exclude those students who, at a particular stage in their school life, have not shown themselves to be academically proficient. They are therefore denied the opportunity to study a musical instrument on these grounds. If we are to believe all the “music makes you smarter” research, then one would be justified in asking “Why don’t we give instruments to particularly low academic achievers as a means of increasing their literacy and numeracy abilities? Equally as justifiable is the question of “Why don’t we give all students the opportunity to study an instrument in an environment where Instrumental Music is included in the curriculum as a separate subject and given the same standing or importance as, for example, Mathematics, Social Studies or Physical Education?”
This study has been conducted in an environment where every child learned an instrument, regardless of his or her academic ability. In this type of setting it can be more accurately determined whether academic ability as a selection method for determining success on a musical instrument is a valid one. In order to achieve this, the following questions were addressed:

Will students with high academic results also produce successful results on a musical instrument?

Will a lower academic score translate to a low instrumental score?

Is it possible for an average or below average academic achiever to be successful on a musical instrument?

Is it possible for a high academic achiever to struggle with learning an instrument?

Will studying an instrument really improve academic results?

Are high, average and below average academic achievers attracted to particular instruments?

Are high academic achievers more likely to continue in the longer term?
Method

To gauge the academic abilities of the student participants in this study, the classroom teachers were asked to give each student a separate literacy and numeracy rating based on their class work, assignments and observations using the following grading descriptors displayed in Table 1.

**Table 1: Academic Result Descriptors**

<table>
<thead>
<tr>
<th></th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Works well above the year level expectations and requirements</td>
</tr>
<tr>
<td>B</td>
<td>Usually produces work above the year level requirements</td>
</tr>
<tr>
<td>C</td>
<td>Is average for the year level</td>
</tr>
<tr>
<td>D</td>
<td>Does not in general meet the year level requirements</td>
</tr>
<tr>
<td>E</td>
<td>Rarely meets the year level requirements</td>
</tr>
</tbody>
</table>

In current educational trends, the terms literacy and numeracy are frequently found side by side in the same sentence. For the purposes of this study, namely to see if one is more favourable than the other when it comes to predicting successful performance on a musical instrument, these two areas will firstly be looked at separately. The spread of academic results across the year levels, displayed in Tables 2 and 3, formed a fairly predictable bell-curve and when separated by gender was generally consistent with current research.

With regard to achievement, in general terms, boys are under-achieving at school in literacy and numeracy-based areas. The extent of achievement by boys in other areas including the arts is not quantifiable at the time of writing. (Harrison, 2005)
### Table 2: Literacy Levels of Cohort One (59 students)

<table>
<thead>
<tr>
<th>Level</th>
<th>Girls</th>
<th>Boys</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>5</td>
<td>1</td>
<td>6</td>
</tr>
<tr>
<td>B</td>
<td>10</td>
<td>5</td>
<td>15</td>
</tr>
<tr>
<td>C</td>
<td>13</td>
<td>8</td>
<td>21</td>
</tr>
<tr>
<td>D</td>
<td>4</td>
<td>12</td>
<td>16</td>
</tr>
<tr>
<td>E</td>
<td>0</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>

### Table 3: Literacy Levels of Cohort Two (68 Students)

<table>
<thead>
<tr>
<th>Level</th>
<th>Girls</th>
<th>Boys</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>6</td>
<td>0</td>
<td>6</td>
</tr>
<tr>
<td>B</td>
<td>8</td>
<td>15</td>
<td>23</td>
</tr>
<tr>
<td>C</td>
<td>12</td>
<td>19</td>
<td>31</td>
</tr>
<tr>
<td>D</td>
<td>0</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>E</td>
<td>1</td>
<td>1</td>
<td>2</td>
</tr>
</tbody>
</table>

As shown in Table 4, the literacy levels of the two cohorts (127 students) were then combined to separate above average (A and B results), average (C result) and below average students (D and E results).
Having gathered this information, the first question raised in this chapter could then be addressed:

Will students with high literacy levels also produce successful results on a musical instrument?

This data was then examined to determine if literacy ability levels are an accurate predictor of producing successful results on a musical instrument. After one year of study of the 50 students across both cohorts who achieved an above-average grading in literacy, 40 of these students or 80% also achieved an above-average result on their musical instrument. On these figures alone it would be fair to state that high literacy ability can certainly be an accurate indicator of successful outcomes on a musical instrument. These findings are also supported in the literature:

It is a common observation of music teachers that children with high intelligence generally tend to reach higher levels of musical achievement than do children with more modest intellectual abilities…those groups showing the highest levels of attainment in general intellectual functioning tend to be more highly motivated towards participation in musical activities. (Sergeant, 1974)

It should be noted however that the total number of successful instrumental results across the two cohorts after one year of study was 78. This number almost doubles the amount of successful results coming from the high academic achievers mentioned above. In effect, this means that 38 of the 78 or almost 49% of the successful

---

Table 4: Combined Summary of Literacy Levels (127 students)

<table>
<thead>
<tr>
<th>Level</th>
<th>Girls</th>
<th>Boys</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Above average</td>
<td>29</td>
<td>21</td>
<td>50</td>
</tr>
<tr>
<td>Average</td>
<td>25</td>
<td>27</td>
<td>52</td>
</tr>
<tr>
<td>Below average</td>
<td>5</td>
<td>20</td>
<td>25</td>
</tr>
</tbody>
</table>
instrumental results were produced by students who were either average or below average in literacy ability. It is therefore appropriate to state that high levels of literacy are not a prerequisite for achieving success in instrumental music.

The numeracy levels of the students were then examined and recorded in the same way as for literacy. This is shown in Tables 5, 6 and 7.

**Table 5: Numeracy Levels of Cohort One (59 students)**

<table>
<thead>
<tr>
<th>Level</th>
<th>Girls</th>
<th>Boys</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>5</td>
<td>2</td>
<td>7</td>
</tr>
<tr>
<td>B</td>
<td>10</td>
<td>6</td>
<td>16</td>
</tr>
<tr>
<td>C</td>
<td>13</td>
<td>14</td>
<td>27</td>
</tr>
<tr>
<td>D</td>
<td>4</td>
<td>4</td>
<td>8</td>
</tr>
<tr>
<td>E</td>
<td>0</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>

**Table 6: Numeracy Levels of Cohort Two (68 students)**

<table>
<thead>
<tr>
<th>Level</th>
<th>Girls</th>
<th>Boys</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>2</td>
<td>4</td>
<td>6</td>
</tr>
<tr>
<td>B</td>
<td>8</td>
<td>14</td>
<td>22</td>
</tr>
<tr>
<td>C</td>
<td>12</td>
<td>16</td>
<td>28</td>
</tr>
<tr>
<td>D</td>
<td>4</td>
<td>5</td>
<td>9</td>
</tr>
<tr>
<td>E</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
</tbody>
</table>
The numeracy levels of the two cohorts (127 students) were then combined to separate above average (A and B results), average (C result) and below average results (D and E results).

**Table 7: Summary of Numeracy Levels at Commencement of Study (127 Students)**

<table>
<thead>
<tr>
<th>Level</th>
<th>Girls</th>
<th>Boys</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Above average</td>
<td>25</td>
<td>26</td>
<td>51</td>
</tr>
<tr>
<td>Average</td>
<td>25</td>
<td>30</td>
<td>55</td>
</tr>
<tr>
<td>Below average</td>
<td>9</td>
<td>12</td>
<td>21</td>
</tr>
</tbody>
</table>

This data was then used to determine whether numeracy ability levels can be used as a reliable predictor of the students’ musical abilities:

Will students with high numeracy results also produce successful results on a musical instrument?

Of the 51 students who were above average in numeracy skills, 42 or 82% also achieved an above average result after one year of study on a musical instrument. As with literacy, it would therefore also be reasonable to say that numeracy ability is also a reliable indicator of predicting successful outcomes in the study of instrumental music. However, once again it cannot be ignored that these 42 students only account for 54% of the total successful instrumental results.

In order to examine the findings and extract more meaning from this data, another question arises: Are the same students achieving high, average or below average results
for both literacy and numeracy and how much overlap or consistency exists between literacy and numeracy ability levels and achievements?

In Cohort One, 17 of the 59 students were achieving above average results in both literacy and numeracy. Four students were above average in literacy only and six students were above average in numeracy only. In Cohort two, 19 of the 68 students achieved an above average result in both literacy and numeracy. Ten students were above average in literacy only and nine students scored above average results in numeracy only. The results of the combined cohorts can be summarized as follows:

Students with above average results in literacy and numeracy—36
Students with above average results in literacy only—14
Students with above average results in numeracy only—15

These results would indicate that whilst a relatively large number of students achieved high results in both literacy and numeracy, an almost equal number achieved an above average result in just one or the other of these two areas. With this separation, it is now possible to discover the significance of these academic results in terms of being reliable predictors of successful outcomes in the study of instrumental music.

Of the 36 students who were above average in both literacy and numeracy, 32 or 89% of these also achieved an above average result for instrumental music. Of the students who were above average in literacy but not numeracy, 50% achieved an above average result in instrumental music. Of the students who were above average in numeracy but not literacy, 67% achieved an above average result in their instrumental music studies.
It can certainly be said that the use of academic ability as a selection method to place students in instrumental music programs will produce a high success rate. Whilst this will ensure quality outcomes in terms of the program it should also be recognised that this method will almost certainly exclude many students who are musically very capable.

In light of the findings above, it is important to fully examine the following questions:

Will a lower academic score necessarily translate to a low instrumental score and is it possible for an average or below average academic achiever to be successful on a musical instrument?

As has been demonstrated above, the high academic achievers accounted for just over half of the successful instrumental results, so it stands to reason that the remainder were achieved by students who had average or, in some cases, below average academic results. Across the two cohorts there were 29 students who were achieving an average result, (C) in both literacy and numeracy. Of these students, 18 or 62% achieved an above average result after one year of study on a musical instrument. Amongst the 35 students who were below average in one or both areas, 13 or 37% achieved an above average result after one year of study on their instrument. Whilst the musical success rate does certainly drop with lower academic achievement, the number of below average academic students who achieve success on a musical instrument is still noteworthy. Arguably, from a moral or educationally ethical standpoint it is possibly more important that these students are identified. The confidence and self-esteem that can ensue from discovering success in another area for students who struggle
academically should not be underestimated. Ben-Tovim and Boyd also support this viewpoint:

A child does not have to be good at school, in order to succeed on the right instrument. Most schools and teachers denigrate those characteristics which make life in the classroom more difficult … In some cases, the very characteristics which school-teachers most dislike can lead to success in learning the right instrument. Often, too the children most under-valued at school make excellent progress on an instrument … (Ben-Tovim and Boyd, 1985)

Considering the fact that it is often only the high academic achievers who are offered places in school instrumental music programs, this study is well placed to address the following question:

Is it possible for a high academic achiever to struggle with learning an instrument?

In this study 89% of the high academic achievers also scored above average results in instrumental music. The remainder of this group of students all scored an average (or C) result after one year of study on their instruments. It would be easy to attribute this success to high intelligence and academic achievement but it is unlikely to be due to any single reason or explanation. There are often numerous contributing factors of a social, environmental or cultural nature that contribute to individual successes. These factors are likely to vary greatly between students and could encompass a broad range of possibilities including prior learning, work ethics, personalities and parental encouragement.

Taking into consideration the amount of literature that examines the relationships between academic and musical ability, the nature of this study provides a strong opportunity to examine the following question:

Will studying an instrument really improve academic results?
It is difficult, or at least unwise, to attribute any improvement in academic standards to a single factor such as learning a musical instrument. There are numerous and diverse factors that will affect student performances at school. These may range from personal, family and peer issues through to areas like school subject selection, participation in co-curricular activities, time management and work or other non-school commitments.

Given the unique nature of this study where every child (regardless of his or her situation or academic ability) is learning an instrument as part of the core-curriculum, it is an area worthy of some exploration.

A summary of the students’ academic results over a two year period can be seen in Table 8. With regard to literacy levels when comparing student results taken in Year 5 and again in Year 7 there were no students whose results fell over this period. There were however 32 students or 25% of the total who improved by at least one grading in the area of literacy. Half of these were students who moved from being below average (D or E) to an average (C) result, 15 moved from being average to above average (C to B) and one student moved from a B to an A result.

The results in numeracy levels after two years of study on a musical instrument showed a similar pattern. Again there were no students whose results dropped, but 36 or 28% increased their grading in numeracy. There were 11 students who moved from being below average to scoring an average result and 25 students who moved from achieving average to above average results.

There were 16 students who improved both their literacy and numeracy levels over the two-year period, another 16 with improved literacy and 20 with improved numeracy.
These numbers may seem relatively small on their own; however, these figures do change the academic dynamic of these two cohorts considerably, as almost 41% of students improved their overall academic performances.

Table 8: Comparison of Literacy and Numeracy Levels before and after two years of Instrumental Study

<table>
<thead>
<tr>
<th>Literacy and Numeracy levels</th>
<th>Number of students before instrumental study</th>
<th>Number of students after two years of instrumental study</th>
</tr>
</thead>
<tbody>
<tr>
<td>Literacy—above average</td>
<td>50</td>
<td>65</td>
</tr>
<tr>
<td>Literacy—average</td>
<td>52</td>
<td>53</td>
</tr>
<tr>
<td>Literacy—below average</td>
<td>25</td>
<td>9</td>
</tr>
<tr>
<td>Numeracy—above average</td>
<td>51</td>
<td>76</td>
</tr>
<tr>
<td>Numeracy—average</td>
<td>55</td>
<td>41</td>
</tr>
<tr>
<td>Numeracy—below average</td>
<td>21</td>
<td>10</td>
</tr>
</tbody>
</table>

These figures obviously show that the overall academic standard of the two cohorts has risen over a two-year period. One interpretation could certainly be that all the students were studying a musical instrument, so therefore it is valid to say that this might well have contributed to the increase in high results. Alternatively, one could or should be asking, “What else if anything were all the students doing that was the same—sport, drama, art, social studies and Chinese—and could this increase in academic success be just as equally attributed to one, or a combination of these other subjects or activities?”
The fact that there was undeniable academic improvement across the two cohorts is certainly encouraging in regard to the study of instrumental music; however, the proof may well lie in an outwardly less obvious statistic. The fact that there was no drop in the standard of literacy and numeracy in these two cohorts is really very unusual from an educational standpoint. A more common or predictable trend would be an expectation of some upward and downward movements in results across a single year level of students. When considering that the content and requirements in each course does increase with every year of study this fact becomes even more important. This may prove to be a defining statistic in the case for studying a musical instrument.

Another unique opportunity arising from this study was the opportunity to examine the instrument choices of the students in relation to their academic ability. This raised the following question:

Are high, average and below average academic achievers attracted to particular instruments?

Table 9 shows the first choices of band instrument preferences amongst the two cohorts of students in relation to academic achievement. The table would appear to indicate that high achievers are attracted to woodwind instruments (particularly the flute) whilst low achievers prefer percussion. This may be due to a real or perceived conception that percussion is an easier option than a woodwind or a brass instrument.
Table 9: Instrument Choices in Relation to Academic Achievement

<table>
<thead>
<tr>
<th>Instrument</th>
<th>Above Average</th>
<th>Average</th>
<th>Below Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flute</td>
<td>15</td>
<td>16</td>
<td>1</td>
</tr>
<tr>
<td>Clarinet</td>
<td>8</td>
<td>8</td>
<td>4</td>
</tr>
<tr>
<td>Saxophone</td>
<td>9</td>
<td>7</td>
<td>1</td>
</tr>
<tr>
<td>Trumpet</td>
<td>3</td>
<td>12</td>
<td>0</td>
</tr>
<tr>
<td>Trombone</td>
<td>4</td>
<td>5</td>
<td>4</td>
</tr>
<tr>
<td>Percussion</td>
<td>5</td>
<td>12</td>
<td>13</td>
</tr>
</tbody>
</table>

As this study spans a three-year period for each cohort, it was appropriate to examine the following question:

Are high academic achievers more likely to continue in the longer term?

After a three-year period of instrumental music study as part of the core-curriculum, the program became elective or voluntary from Year 8. The cost of lessons and instrument hire were still included in the overall school fees which meant that financial concerns were not a major factor in whether the students continued with their studies.

In Cohort One, 28 students or 47% elected to continue with their instrumental study after the compulsory period. In Cohort Two, 40 students or 58% continued. Looking at the academic abilities of the overall 68 or 53% of students who continued with instrumental study, the data reveals that just as many average students are as likely to
continue instrumental studies as above average students. This information is summarised in Table 10.

**Table 10: Academic Levels of Students Continuing in Elective Program**

<table>
<thead>
<tr>
<th>Level of academic achievement</th>
<th>Numbers continuing</th>
</tr>
</thead>
<tbody>
<tr>
<td>High</td>
<td>31</td>
</tr>
<tr>
<td>Average</td>
<td>31</td>
</tr>
<tr>
<td>Below average</td>
<td>6</td>
</tr>
</tbody>
</table>

**Summary and Conclusions**

Using academic ability as selection criteria for placing students in instrumental music programs will almost certainly equate to a high success rate, and is indeed a reliable indicator of whether or not a student will succeed on an instrument. It has however become quite clear that using this method will definitely not catch all the students who will achieve highly. Average or below average academic results do not in most cases lead to poor performances on musical instruments. It would therefore be reasonable to say that whilst this method is a fairly accurate predictor of success, as a method of selecting suitable candidates to participate in a program, it is also rather exclusive and elitist.

Stephanie Stein Crease’s description of the condition of America’s instrumental music programs supports the findings of this study:

> The 2001 federal No Child Left Behind Act, which mandates improving basic literacy and math skills has once again relegated music and other subjects to the back burner in many schools. Sadly, there is not a No Child Left Behind policy for music education, though numerous studies point to the academic benefits of learning a musical instrument. (Crease, 2006)
The discovery that no students’ academic achievement results fell in the course of this study needs to be stressed. This fact should serve to quash the notion that the time devoted to learning an instrument in a school setting and in curriculum time might have a detrimental effect on students with average or below average academic achievements. The fact that the overall academic levels of both cohorts increased considerably over the course of the study may not be wholly attributable to the study of a musical instrument, however the coincidence is hard to ignore. British writer Richard Crozier aptly sums this up:

There are no grounds for excluding any child from learning to play a musical instrument. (Crozier, 2007)
Chapter 3: Study B- Rhythmic and Pitch Skills

Musical aptitude testing as an indicator of success in the study of a musical instrument
Background and Rationale

In the process of selecting suitable students for instrumental programs and deciding on appropriate instruments, how much weight should be placed on a child’s existing musical aptitude? Is the ability to sing in tune, reproduce a given rhythm, pitch or melody, or distinguish between different pitches or timbres important prerequisites in the study of a musical instrument?

This chapter will explore the concept of musical aptitude testing, specifically pitch and rhythmic skills, as a reliable predictor of performing successfully on a musical instrument. By exploring the relationship between these skills, it is hoped to establish just how valid these tests are. In my experience there are a number of instrumental music teachers, for example in strings and brass, who will insist that it is essential for potential students to possess “a good ear” in order to be successful players of these instrument families. This thinking relies on the concept that if a student cannot sing in tune, or clap a rhythm accurately they are therefore unlikely to be successful on an instrument.

There is quite often a perception amongst parents that if their child is not “musical” there is probably little point in beginning the study of a musical instrument. This concept of being unmusical or “tone deaf” is often reached by way of a child’s singing abilities. This line of thought makes the assumption that the same set of skills involved in producing a pleasing and in-tune vocal sound are required in the playing of an instrument.
As with academic ability, the literature on musical aptitude testing is somewhat divided between those who believe musical ability to be inherited or innate, and those who believe such ability can be developed over time and with appropriate instruction.

Krumhansl and Haroutouian suggest that the ear can be trained and developed but the extent to which this can happen is somewhat dependent on the natural or pre-existing ability of the individual:

The listener’s experience of a particular musical sequence is driven and constrained by the sounds registered by auditory mechanisms and processed by available mental resources. Furthermore, the construction of the music itself must respect the listener’s capacities for appreciating structured auditory information. That is, the way musical materials are formed must take into consideration certain inherent limitations and special capabilities of the listener. (Krumhansl 1990)

The aural discrimination skills of music aptitude seem to be a given starting point, specifically mentioning the ability to discriminate pitch and rhythm and the inner sensing of sound. (Haroutounian 2002)

General mental capacity of the individual is also high on Krumhansl’s list of prerequisites for possessing rhythmic and pitch skills:

The duration of rhythmic and pitch patterns may reflect limitations in memory capacity … These limitations may in some cases be overcome through perceptual learning or by special instruction or additional descriptions. However, there are inherent bounds to the ways in which music can be perceived due to the nature of the human psychological system for perceiving music. (Krumhansl 1990)

Like Suzuki, Hungarian composer and educator Zoltán Kodály believed that all children who are capable of lingual literacy are also capable of developing musical literacy.

More recently, Cutietta and Crozier bring into question the idea of being considered “musical” as a justification for instrumental music study:
One way in which we are investigating this area is in attempting to justify musical instrument instruction on a broader educational front. Musical instrument teaching tends to be justified on the grounds of musical ability which itself is considered to foster musical instrument learning—the self fulfilling argument in which pupils who are musical do well at musical instruction and those who don’t are labelled “not good at music”. This view reinforces the exclusive elitist attitude that some have towards instrumental instruction. However, it is more plausible that musical instrument instruction is underpinned by multiple abilities rather than any uni-dimensional talent. (Cutietta 2001)

Crozier is somewhat more committed to this concept but prefers to present a wider view that covers a broader range of possibilities:

Playing a musical instrument well involves multi-tasking … showing an interest in music is not the same as having ability, just as testing innate ability is not a certain pointer to future success … a child with perfect pitch is likely to show an aptitude for music and one view states that it is this child who should be given opportunities. Other children find judging pitch difficult … another view says that these are the very children who should be given most opportunities to improve their skills. (Crozier 2007)

Cutietta does however suggest that one’s ability in aural and rhythmic skills should perhaps play a role in determining which instrument is chosen for study. He even suggests sport or dance as an alternate activity for children with weaker pitch skills:

To provide the atmosphere that will be most conducive to this musical development, it is necessary to divide musical aptitude into two separate, but equal components. One component is related to a person’s rhythmic potential and the other is related to his or her melodic (or tonal) aptitude. Both are important for musicians, but it is possible to be strong in one dimension while weak in another. Therefore, a child with high rhythmic aptitude and lower tonal aptitude may be more drawn to dance, a rhythmic instrument such as drums or guitar, or even sports (where timing is crucial). Likewise, a student with high tonal aptitude but lower rhythmic aptitude might be more drawn to a melodic instrument such as violin, flute or voice. (Cutietta 2001)

First released in 1985, reprinted in 1990 and most recently revised in 2005, The Right Instrument for Your Child by Ben-Tovim & Boyd has sold thousands of copies worldwide. The authors advocate a three part testing method consisting of a musicality test, a “readiness” test and an assessment combining physicality, mentality and personality. The musicality test, which involves a set of 13 yes/no questions, incorporates pitch discrimination, as well as melodic and rhythmic skills.
The authors suggest that the musicality test should be delivered first, and used to gauge whether or not the child is ready or indeed “musical” enough to begin learning an instrument. The test has been included here for viewing firstly because of the popularity of the publication, and secondly because questions three, four and seven are similar to the aural skills tests used in this study (see Figure 4):

Question three—*can the child tell which the high note is when you sing HEE-HAW with HEE high and HAW low?*

The Australian nursery rhyme equivalent to this is most likely SEE-SAW or RAIN-RAIN which uses the interval of a descending minor third across the two syllables. This basic test of pitch discrimination is commonly used in musical aptitude testing. The relationship between having basic pitch discrimination and whether it is helpful when learning an instrument is yet to be explored or investigated.

Question four—*can the child clap back to you a simple rhythm you tap out on the table?*

Basic rhythmic accuracy is another commonly used criterion for testing musical aptitude. The idea of a teacher clapping a rhythm and having the child or class repeat an exact copy has found its way from the music classroom into every day primary classroom usage. Teachers will often use the well-known “Ta, Ta, Te-te, Ta” (two crotchets, two quavers, single crotchet or slight variations of this) to focus the attention and settle their groups.
Memory skills, be it very short term, also play a part in this type of testing. Whether it is in fact “musical” memory that is required to do this successfully and whether this is an important prerequisite for learning an instrument is also an area yet to be extensively researched.

Question seven—can the child complete the melody if you sing the first half of a known tune?

This study uses a variation on this test that is also used by the Australian Music Examinations Board (AMEB) in their aural skills component of practical examinations. The AMEB is a sequential series of publically administered examinations from preliminary to diploma level. Examinations can be undertaken on any orchestral instrument as well as guitar, voice and piano. This system of examinations is well respected throughout Australia, and is widely used in schools and by private music teachers and individual entrants.

Instead of using a known tune, the student is asked to hum or sing the final note (tonic) of a short unfinished melody. Again, the object here is to determine whether the ability to sing the required pitch accurately is a good predictor of being successful on an instrument.

A study undertaken by Phillips and Aitchison in 1997 on pitch discrimination between accurate and inaccurate singers, on children of a similar age to those in this study, returned the following findings:

no obvious difference in pitch discrimination was found between accurate and inaccurate singers.

no obvious difference in pitch discrimination was found between males and females.
An obvious difference was found in tonal aptitude between accurate and inaccurate singers, in favour of the accurate singers.

No obvious difference in tonal aptitude was found between male and female singers.

Some conclusions arising from their testing included:

No significant interactions were found for singing accuracy or inaccuracy by gender. Results seem to suggest that inaccurate singers are not “tone deaf” or lacking in sufficient aural acuity to match pitch. (Phillips and Aitchison 1997)

Due to a popularity spanning more than 25 years, the Musicality Test from Ben-Tovim and Boyd’s publication, *The Right Instrument for Your Child* (1985) has been included in this chapter (Figure 3). The instructions given by Ben-Tovim and Boyd for teachers or parents for assessing or interpreting the musicality test results are very straightforward:

You want to be sure that he or she is musical enough to learn to play an instrument. If you circled YES fewer than eight times, this does not necessarily mean your child is unmusical. Most likely he or she is too young or too much occupied with school or other pressures to begin to develop musically … do the Test again in six months … If you circled YES eight or more times your child is ready to learn an instrument. (Ben-Tovim and Boyd 1985).

Over the course of a ten-year study undertaken by Ben-Tovim and Boyd, which examined the differences between children who were successful on a musical instrument and those who gave up, they found that children who gave up were no less “musical” than the successful ones. They claim that in 90% of cases students give up learning for one of two reasons—either starting at the wrong time, or on the wrong instrument.
Circle round the appropriate answer.

**Part A – Abilities**

Can the child:

- recognize the theme music of favourite TV shows?  
  - yes  
  - no

- join in with “pop” at the right time when you sing Pop Goes The Weasel?  
  - yes  
  - no

- tell which is the high note when you sing HEE-HAW with HEE high and HAW low?  
  - yes  
  - no

- clap back to you a simple rhythm you tap out on the table?  
  (Use the first two lines of Baa Baa Black Sheep)  
  - yes  
  - no

- identify correctly, with eyes closed, the sounds of you tapping  
  (a) a glass and (b) a small saucepan? (Rehearse this with eyes open first.)  
  - yes  
  - no

- sing or whistle accurately a familiar TV theme, or song, when asked to do so?  
  - yes  
  - no

- complete the melody if you sing the first half of a known tune?  
  (E.g. Parent: Baa baa black sheep, have you any wool?  
  Child: Yes sir, yes sir, three bags full.)  
  - yes  
  - no

- name three or more musical instruments?  
  - yes  
  - no

- name one, or more than one, instrumental musician?  
  - yes  
  - no

**Part B – Activities**

Does the child:

- enjoy listening to music?  
  - yes  
  - no

- respond physically to music?  
  - yes  
  - no

- have some favourite music on record or cassette which he/she plays frequently?  
  - yes  
  - no

- repeatedly express a desire to play a certain instrument? (This will not necessarily be the right one.)  
  - yes  
  - no

Figure 3: Ben-Tovim and Boyd’s Musicality Test (1985)
The current study is unique in the fact that all students will study instrumental music regardless of their results in the pitch and rhythmic musical aptitude testing. In this way it can be determined whether individual pitch and rhythmic abilities are reliable indicators of producing successful results on a musical instrument.

The resulting data was used to examine the following questions:

- Will strong rhythmic skills equate to instrumental success?
- Will strong pitch skills equate to instrumental success?
- Will one skill be more important than the other in relation to instrumental success?
- Is it possible for a student with strong pitch or rhythmic skills to struggle with learning an instrument?
- Will weak pitch and rhythmic skills necessarily equate to poor instrumental results and is it possible for a student with limited aural skills to achieve success on an instrument?
- Will these skills matter to greater and lesser degrees for different instruments?
- Are students with high, average and below average pitch and rhythmic skills attracted to particular instruments?
- Are the students with strong pitch and rhythmic skills also high academic achievers?
Method

The rhythmic and pitch skills test in this study (Figure 4) was largely based on material from the AMEB Preliminary and Grade One aural tests. These tests form one section of the practical examinations for all band and orchestral instruments in the AMEB syllabus and were considered age appropriate for the students in this study.

To ensure the best possible consistency in the testing method, students were seen individually, on the same day and tested by the same person. The following four tests were performed.

Rhythmic tests:

- the ability to clap the beats of a simple chord passage in time with the piano
- the ability to clap a simple 2-bar phrase consisting of crotchets and quavers

Pitch tests:

- the ability to distinguish between two pitches (students were asked which note was higher—the first or second one?)
- the ability to sing the last note (tonic) of an unfinished melody
In order to determine whether pitch or rhythmic ability might be weighted differently when considering outcomes on a musical instrument, the students were given a separate A to E rating for both rhythm and pitch using the grading descriptors shown in Table 11. The descriptors were also designed to provide as much distinction and clarity as possible between the result gradings. Each test was played once only.

**Figure 4: Aural Skills Test – based on AMEB Preliminary and Grade One Aural Tests**
Table 11: Descriptors for Rhythm and Pitch Grading

<table>
<thead>
<tr>
<th>Grading</th>
<th>Rhythm</th>
<th>Pitch</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Sense of pulse was accurate Rhythm was repeated completely accurately</td>
<td>Higher or lower pitch was accurate</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Very accurate pitch</td>
</tr>
<tr>
<td>B</td>
<td>Sense of pulse was accurate Rhythm was repeated with one minor error only</td>
<td>Higher or lower pitch was accurate</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Almost accurate pitch</td>
</tr>
<tr>
<td>C</td>
<td>Some difficulty maintaining a steady pulse More than one error in repeating the rhythm</td>
<td>Some hesitations in distinguishing higher and lower pitch</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Direction accurate, intonation inaccurate</td>
</tr>
<tr>
<td>D</td>
<td>Unable to maintain a steady pulse More than three errors in repeating the rhythm</td>
<td>Difficulty distinguishing between higher and lower pitch</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Inaccurate pitch direction</td>
</tr>
<tr>
<td>E</td>
<td>Unable to identify the pulse Not identifiable or not attempted</td>
<td>Unable to distinguish between higher and lower pitch</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Very inaccurate pitch or not attempted</td>
</tr>
</tbody>
</table>

In order for further comparisons to be made later in this study, the results have been displayed separated by gender in Table 12.

Table 12: Rhythmic Ability Levels of Cohort One (59 students)

<table>
<thead>
<tr>
<th>Level</th>
<th>Girls</th>
<th>Boys</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>5</td>
<td>1</td>
<td>6</td>
</tr>
<tr>
<td>B</td>
<td>16</td>
<td>8</td>
<td>24</td>
</tr>
<tr>
<td>C</td>
<td>10</td>
<td>15</td>
<td>25</td>
</tr>
<tr>
<td>D</td>
<td>1</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>E</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

From these results, as with the academic results from the previous chapter, it is apparent that the girls in this cohort are out-performing the boys in the area of rhythmic ability. It is interesting to note that in Cohort One of the 5 girls who recorded an “A” for both
literacy and numeracy, four of them also recorded an “A” result for the rhythmic component of the aural skills testing.

One year later and under the same conditions, the four aural tests were administered to the second cohort of students. The rhythmic ability levels of these students are shown in Table 13.

**Table 13: Rhythmic Ability Levels of Cohort Two (68 students)**

<table>
<thead>
<tr>
<th>Level</th>
<th>Girls</th>
<th>Boys</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>21</td>
<td>23</td>
<td>44</td>
</tr>
<tr>
<td>B</td>
<td>3</td>
<td>10</td>
<td>13</td>
</tr>
<tr>
<td>C</td>
<td>2</td>
<td>8</td>
<td>10</td>
</tr>
<tr>
<td>D</td>
<td>0</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>E</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

In cohort two, there appeared to be a different trend in rhythmic abilities. The boys in this cohort were slightly out-performing the girls at the upper end of the results and the overall number of students who achieved a high result increased quite distinctly in this cohort. It is also interesting to note that the same gender trends were also evident in the academic results of this cohort.

The rhythmic ability levels of the two cohorts were then combined in Table 14 to show the total number of above average (A and B results), average (C result) and below average students (D and E results) in the study.
Table 14: Combined Summary of Rhythmic Ability Levels (127 students)

<table>
<thead>
<tr>
<th>Level</th>
<th>Girls</th>
<th>Boys</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Above average</td>
<td>45</td>
<td>42</td>
<td>87</td>
</tr>
<tr>
<td>Average</td>
<td>12</td>
<td>23</td>
<td>35</td>
</tr>
<tr>
<td>Below average</td>
<td>1</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

At this point the question of whether or not existing rhythmic awareness or skills have an impact on instrumental success were analysed and assessed.

Will strong rhythmic skills equate to instrumental success?

Of the 87 students who displayed strong rhythmic skills (A or B result) in the testing, 58 also achieved a successful result on a musical instrument after one or two years of study. This equates to 66.6% or two thirds of the rhythmically above average students achieving success on a musical instrument. Whilst this points to rhythmic testing as a generally reliable predictor of musical ability the result is not alarmingly high.

Furthermore, the same result indicates that the remaining third of rhythmically capable students only achieved an average or below average result on a musical instrument.

The pitch or melodic skills of the students were then analysed separately to establish any connection or link with success on a musical instrument.
The data collected relating to the element of pitch or melodic ability levels was then examined in the same way as for rhythmic skills and with the same goal in mind - to determine whether it has significance in relation to the study of musical instruments. The pitch ability levels of cohort one can be seen in Table 15, separated by gender.

**Table 15: Pitch Ability Levels of Cohort One (59 students)**

<table>
<thead>
<tr>
<th>Level</th>
<th>Girls</th>
<th>Boys</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>4</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td>B</td>
<td>14</td>
<td>5</td>
<td>19</td>
</tr>
<tr>
<td>C</td>
<td>13</td>
<td>15</td>
<td>28</td>
</tr>
<tr>
<td>D</td>
<td>1</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>E</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

The results shown in Table 15 indicate that the pitch or melodic awareness in Cohort One is very similar to their overall rhythmic ability. The majority of students in this cohort (46 of the 59 or almost 78%) achieved the same result for both rhythmic and pitch testing. In just over 20% of cases there was a variation of only one grading and in only 2% of cases, a variation of more than one grading.

The pitch ability levels of the students in Cohort Two are summarised in Table 16 and would appear to draw a parallel with their rhythmic skills results (Table 13).
As with the rhythmic ability results, Cohort Two would appear to be musically a much stronger year level of students than the first cohort. In my experience, this phenomenon of entire cohorts of students performing quite differently from another is not uncommon in teaching. This trend is a frequently discussed topic amongst teachers across many subject areas. Although this kind of differentiation is quite common, it is not an area that is well researched or documented and it would seem to be simply accepted as a “given” amongst the teaching fraternity.

Just over half of the students in the second cohort (35 of the 68, or 51%) achieved the same result for both rhythmic and pitch testing. In 31% of cases there was a variation of only one grading between pitch and rhythm and in 18% of cases there was a variation of more than one grading. Whilst cohort two does appear more musically capable as a whole, their results are less consistent across the two aural disciplines of pitch and rhythm.

Table 16: Pitch Ability Levels of Cohort Two (68 students)

<table>
<thead>
<tr>
<th>Level</th>
<th>Girls</th>
<th>Boys</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>18</td>
<td>23</td>
<td>41</td>
</tr>
<tr>
<td>B</td>
<td>4</td>
<td>9</td>
<td>13</td>
</tr>
<tr>
<td>C</td>
<td>4</td>
<td>5</td>
<td>9</td>
</tr>
<tr>
<td>D</td>
<td>0</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>E</td>
<td>0</td>
<td>2</td>
<td>2</td>
</tr>
</tbody>
</table>
As with rhythmic ability, the results of the two cohorts were combined as shown in Table 17, to show an overall view of the pitch ability levels of all students in the study.

**Table 17: Combined Summary of Pitch Ability Levels (127 students)**

<table>
<thead>
<tr>
<th>Level</th>
<th>Girls</th>
<th>Boys</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Above average</td>
<td>40</td>
<td>38</td>
<td>78</td>
</tr>
<tr>
<td>Average</td>
<td>17</td>
<td>20</td>
<td>37</td>
</tr>
<tr>
<td>Below average</td>
<td>1</td>
<td>11</td>
<td>12</td>
</tr>
</tbody>
</table>

Using this information the following question could be addressed:

Will strong pitch skills equate to instrumental success?

Of the 78 students who displayed strong pitch skills (A or B result) in the testing, 60 of these also achieved a successful result on a musical instrument after one or two years of study. These figures show that 77% of the students whose pitch or melodic skills were above average also achieved success on a musical instrument.

As with rhythmic testing, perhaps even more so, it can be said that pitch testing is a reliable predictor of musical ability. The other aspect of this result indicates that the remaining 23% of students who achieved a high result in the pitch test only achieved an average or below average result on a musical instrument.
Similar to literacy and numeracy skills which often seem to be grouped together when referring to general academic ability, so too are pitch and rhythmic skills when referring to musical aptitude. As is evident from the data in the previous chapter, skills in literacy and numeracy are not always evenly matched between students. Equally, the same can be said for pitch and rhythmic skills in relation to aural based musical aptitude testing. In light of this, it is important to ask the following question: Will one skill be more important than the other in relation to instrumental success?

From these results it could be said that pitch or melodic awareness may be, to some extent, more important than rhythmic skills as an indicator of achieving success on a musical instrument. The statistics clearly show that the majority of students who display either pitch or rhythmic awareness will achieve a successful result on a musical instrument.

Using these types of testing methods alone in a school situation where retention rates can be critical to a program could certainly prove to be unwise. A “drop-out” rate of between 30–40% would be considered unacceptable and could be quite detrimental to establishing a band program. These results would suggest that musical aptitude methods of testing need to be combined with a range of methods or at least some other procedures if student numbers are to be retained over a period of time.

To further investigate the impact of pitch and rhythmic skills on instrumental study the following question was addressed:

Is it possible for a student with strong pitch or rhythmic skills to struggle with learning an instrument?
There was a relatively small number of students across the two cohorts who achieved a high result for pitch and rhythmic skills that did not achieve a successful result on a musical instrument. In Cohort One this only applied to three students or 5% of the cohort. In the second cohort there were 15 students who fell into this category—a much higher 22% of the cohort. In total, 18 of the 127 students, or 14% of the combined cohorts displayed pitch and rhythmic aptitude but were not successful on a musical instrument.

This result is really neither alarming nor surprising and in the scheme of an instrumental music program it is probably not even all that important. An attrition rate of around 14% in a band program would be considered fairly normal. From an educational opportunity or participation perspective these students have been given access to a program and have experienced the study of a musical instrument. The factors contributing to them being unsuccessful within the program could be so many and varied that for the purposes of this study it is hardly worth investigation.

From an educational standpoint this is not nearly as important as the reverse scenario addressed in the following question:

Will weak pitch and rhythmic skills necessarily equate to poor instrumental results and is it possible for a student with limited aural skills to achieve success on an instrument?

In total there were 55 students across the two cohorts who registered an average or below average score in one or both areas of the aural skills testing. Of these students 34 or 62% achieved an above average result on their musical instrument after one or two years of study. This number represents approximately 26% of the total student body in
this study. Amongst 33 students who were average or below average in both pitch and rhythmic skills, 21 or 64% were successful on an instrument. As the number of students who were below average in both pitch and rhythmic skills is so small (3 of the 127) it is worth making reference to them separately. All three of these students are still playing their chosen instruments three years into the elective instrumental program. At the last assessment one student achieved a “B” grading on clarinet and the other two, a satisfactory or “C” grading on trombone and percussion.

These results are particularly important when considering the fact that in many instrumental music programs students who score below average results in musical aptitude testing may not be offered the opportunity to begin the study of a musical instrument. When these numbers are viewed as individual children the significance is perhaps even greater.

From an educational opportunity or participation perspective, this is an area of concern. This study has quite clearly demonstrated that musical aptitude testing does not necessarily indicate which students will achieve success on an instrument. Most importantly, an average or below average score in musical aptitude testing certainly does not indicate that a successful outcome is unlikely on a musical instrument.

Will these skills matter to greater or lesser degrees for different instruments? Whilst some writers (Krumhansl, Ben-Tovim & Boyd) suggest that an individual’s pitch and rhythmic skills might point to the study of a particular instrument, there is nothing in the resulting data from this study to suggest that students with strong or weak
aural skills (either pitch or rhythmic based) should be directed towards or away from any specific woodwind, brass or percussion instrument.

Of the relatively small number of students (14) with below average aural skills in one of either pitch, rhythm or in both, half achieved successful results (“A” or “B” grading) on the following instruments: clarinet (1), saxophone (1), trumpet (2), trombone (1) and percussion (2). The only instrument missing from this list is flute. Only one student in this category chose to trial the flute and this student achieved a satisfactory or “C” grading.

The data gathered in this chapter combined with each students’ choice of instrument, provided the opportunity to address the following question:

Are students with high, average or below average pitch and rhythmic skills attracted to particular instruments?

Table 18 shows the student’s first choice of instrument in relation to their pitch skills. It should be noted that the instruments shown in this table are initial first choices and not necessarily the instrument chosen for long-term study after the trial period. It should also be noted that the students were not made aware of their individual scores resulting from the aural skills testing and therefore this did not have an influence on their instrument choice.
Table 18: Initial First Choice of Instrument in Relation to Pitch Ability Levels

<table>
<thead>
<tr>
<th>Pitch Aptitude</th>
<th>Flute</th>
<th>Clarinet</th>
<th>Sax</th>
<th>Trumpet</th>
<th>Trombone</th>
<th>Percussion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Above average</td>
<td>24</td>
<td>10</td>
<td>16</td>
<td>7</td>
<td>2</td>
<td>19</td>
</tr>
<tr>
<td>Average</td>
<td>9</td>
<td>5</td>
<td>8</td>
<td>2</td>
<td>2</td>
<td>11</td>
</tr>
<tr>
<td>Below average</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>6</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

From the numbers on this table, it could simply be said that flute, saxophone and percussion are popular instrument choices amongst primary school students. Clarinet and trumpet appear to be ranking fairly equally, whilst the trombone would seem the least popular. It could also be said that students with strong pitch skills like to choose melodic instruments, but this makes it difficult to explain the large numbers choosing percussion.

It is worth noting a trend amongst students with above average pitch skills whose initial first preference was percussion. These students generally changed their instrument preferences after an initial trial period as shown in Table 19. This might suggest that the students who had naturally strong pitch skills found percussion to be musically unsatisfying.
Table 19: First Choice of Instrument in Relation to Pitch Ability Levels after Instrumental Trial Period

<table>
<thead>
<tr>
<th>Pitch Aptitude</th>
<th>Flute</th>
<th>Clarinet</th>
<th>Sax</th>
<th>Trumpet</th>
<th>Trombone</th>
<th>Percussion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Above average</td>
<td>25</td>
<td>14</td>
<td>11</td>
<td>8</td>
<td>6</td>
<td>14</td>
</tr>
<tr>
<td>Average</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>9</td>
<td>3</td>
<td>10</td>
</tr>
<tr>
<td>Below average</td>
<td>2</td>
<td>1</td>
<td></td>
<td>3</td>
<td></td>
<td>6</td>
</tr>
</tbody>
</table>

The same method of analysis was then applied to the students’ rhythmic ability levels. As is evident in Table 20, there was a similar popularity trend towards flute, saxophone and percussion.

Table 20: Initial First Choice of Instrument in Relation to Rhythmic Ability Levels

<table>
<thead>
<tr>
<th>Rhythmic Aptitude</th>
<th>Flute</th>
<th>Clarinet</th>
<th>Sax</th>
<th>Trumpet</th>
<th>Trombone</th>
<th>Percussion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Above average</td>
<td>28</td>
<td>9</td>
<td>18</td>
<td>8</td>
<td>5</td>
<td>20</td>
</tr>
<tr>
<td>Average</td>
<td>5</td>
<td>5</td>
<td>7</td>
<td>1</td>
<td>1</td>
<td>15</td>
</tr>
<tr>
<td>Below average</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td></td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>

After the instrumental trial period, it is evident that the student numbers are certainly more evenly distributed between the instruments and ability levels. Table 21 demonstrates this trend in relation to rhythmic ability levels.
Almost half the student population (62 or 49%) changed their preference of instrument after the trial period. Flute, saxophone and percussion, whilst still emerging as popular choices, all had 15-16 students changing their first preferences. Clarinet, trumpet and trombone did increase substantially in popularity after the trial period.

The available data does not conclusively suggest that different ability levels of musical aptitude are best suited to particular instruments. The data certainly does suggest that there needs to be a method or combination of methods in place in order to identify the most suitable instrument for each individual student.

In order to identify any links between academic and musical ability, the following question was examined:

Are the students with strong pitch and rhythmic skills also high achievers in literacy and numeracy?

There were 30 students across the two cohorts who were high academic achievers, and who also scored an above average result in the aural skills testing. This number accounts for only 24% of the total students. A further 36 students who scored highly in

<table>
<thead>
<tr>
<th>Rhythmic Aptitude</th>
<th>Flute</th>
<th>Clarinet</th>
<th>Sax</th>
<th>Trumpet</th>
<th>Trombone</th>
<th>Percussion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Above average</td>
<td>26</td>
<td>16</td>
<td>13</td>
<td>9</td>
<td>7</td>
<td>16</td>
</tr>
<tr>
<td>Average</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>7</td>
<td>4</td>
<td>12</td>
</tr>
<tr>
<td>Below average</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>2</td>
</tr>
</tbody>
</table>
the aural skills testing were average academic achievers and another 12 successful aural results were achieved by students with below average academic results. These results suggest that academic ability, musical aptitude and the ability to play an instrument are not a clearly linked set of skills. The data from this chapter and the previous chapter shows quite a mixture of academic and musical skills amongst the two cohorts. For example, there are students who have strong numeracy skills, but weak rhythmic skills and others with weak literacy levels but strong pitch and rhythmic skills. The mixture of results relating to skills in literacy, numeracy, rhythm and pitch are many and varied. More importantly, there does not seem to be one particular skill or set of skills which are necessary to achieve success on an instrument.

**Summary and Conclusions**

From the data gathered in this chapter it becomes clear that there are two ways of viewing musical aptitude testing:

Musical aptitude testing is quite a reliable way of selecting students who will be successful in an instrumental music program.

Musical aptitude testing, tests exactly that—musical aptitude.

In relation to the first viewpoint, it is certainly fair to say that a large percentage of students who score well in musical aptitude testing will also produce successful results on a musical instrument. However, it is also clear that a large percentage of students will still perform well on a musical instrument, despite an average or below average musical aptitude test result. Therefore, it must be recognised that musical aptitude testing cannot, or should not be relied upon, as a single predictor of successful results in instrumental music. These findings are also supported in the literature by Turner and Kemp:
Perfect pitch does not make a perfect musician, and a person with only relatively good pitch can accomplish great musicality. In other words, pitch and musical ability are separate issues. (Turner 2004)

Musical ability tests may assist in identifying certain auditory capacities, but these represent only a limited part of what might be considered to be a global view of the total musician. (Kemp 1996)

If access to instrumental music programs is only given to those students who perform well in musical aptitude testing then clearly a great deal of potential is lost. This has been conclusively proven in this chapter as demonstrated by the high number of successful results obtained by students who tested average or below average in musical aptitude. Programs where every child is given the opportunity to study instrumental music will go a long way towards achieving this potential.
Chapter 4: Study C- Timbre Preference

As an indicator of success in the study of a musical instrument
Background and Rationale

This chapter will investigate timbre as a method of instrument selection. Some substantial research has been undertaken on timbre preference, particularly in relation to gender, but to date there is no quantifiable evidence relating timbre preference to learning outcomes. For the purposes of this study the term “timbre” refers to the individual character or quality of a particular instrumental tone or sound.

The Instrument Timbre Preference Test (Gordon, 1984) was developed with the specific intent of determining which sound or sounds an individual prefers to hear. The rationale behind using the Gordon Test as a method of instrument selection is quite simply, that if students like the sound their instrument makes, they are more likely to practice it and therefore have a more positive learning experience. From conversations with instrumental music teachers, both in Queensland, New South Wales and Victoria, it would appear that this method is used quite extensively in primary and middle schooling to assist in matching students to an appropriate instrument.

There is evidence in the literature to support the concept that liking the sound of an instrument may be beneficial in promoting successful learning outcomes:

- Research has found that children will practice more and achieve more if they like the sound of their own instrument best. (Zdzinski 2004)

- The choice of instrumental sound is often vital to the learner’s motivation. (Green 2008)

- Enjoying the sounds of music played by a particular instrument should be a prerequisite for a serious course of study on that instrument. (Turner 2004)
This chapter will explore the following questions:

Will a student succeed on an instrument if he or she demonstrates a liking for the timbre?

Will a student perform poorly on an instrument if he or she demonstrates a dislike for the timbre?

How do students perform who do not demonstrate a timbre preference?

Does timbre preference matter to a greater or lesser degree for different instruments?

Does gender play a role in timbre preference?

What happens when timbre preference and student choice of instrument clash?

Are there relationships between academic achievement and timbre preference?

Is timbre preference related to musical aptitude?

**Method**

All 127 student participants in this study undertook the Gordon Test in a controlled classroom environment. The sounds that the students hear in this test are all electronically generated using a Moog Opus 3 Synthesizer. In a validation test involving 186 music professors, teachers, and students, Gordon found that all the participants identified at least one of the instruments that each sound was supposed to represent. The seven synthesized sounds are intended to represent the timbres of the following instruments:
A–flute
B–clarinet
C–saxophone
D–oboe/bassoon
E–trumpet
F–trombone/baritone/French horn
G–tuba

There are several justifications for Gordon’s thinking behind the use of synthesized sounds as opposed to natural instrument timbres. Firstly, he stated that it is impossible to perform the same melody on different instruments with exactly the same musical expression. This could mean that students might base their decisions purely on the quality of the musical expression. More importantly, students may claim to prefer a timbre based on familiarity or association with a particular instrument. Using actual instruments to determine timbre preference also means that there is no way to accurately measure the degree to which gender-stereotyping influences students’ preferences for particular timbres. The use of synthesized sounds, giving no information of the representative instrument, means the results of the responses is more likely to give an accurate reflection of the students’ timbre preferences irrespective of any gender or other association bias.

The seven timbres are arranged into 42 recorded test items: each of the seven timbres is paired twice with every other timbre. The student listens to each pair of timbres and indicates which one of the two he prefers. Gordon attests that the timbre is the only factor that changes in each test item, as the melody is the same and the musical
expression is consistent for every timbre. The student hears each of the seven timbres twelve times throughout the test and if he chooses a particular timbre at least ten of the twelve times, he is considered to have a preference for that timbre.

The highest number (or preference) a student can demonstrate for a particular sound is a score of 12, the lowest being zero. A score of 10, 11 or 12 demonstrates, according to Gordon, a strong preference for that sound and conversely, a score of 0, 1 or 2 can be interpreted as a dislike for a particular timbre. According to Gordon, it is possible for a student to demonstrate a preference for as many as four timbres and it is equally possible for a student to show no strong preferences or particular dislikes for any of the timbres. Gordon also states that in most groups, around 75% will demonstrate a timbre preference.

**Test Results – Cohort One (59 Students)**

In the first cohort, 34 students (13 boys and 21 girls) or about 58% demonstrated either a single or multiple timbre preference. This percentage is considerably lower than that of Gordon's own test trials. This aside, it can still be said that more than half of the students in this cohort did demonstrate timbre preferences. Of these students, 24 (11 boys and 13 girls, or 41%) showed a clear single preference and ten students (2 boys and 8 girls, or 17%) demonstrated an equal or almost equal preference for two timbres. The remaining 25 students (14 boys and 11 girls, or 42%) did not display clear preferences for any particular timbres. Table 22 shows the frequency of single, multiple and no timbre preference in the first cohort.
**Table 22: Gordon Test- Cohort 1**

<table>
<thead>
<tr>
<th>Timbre Preference</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single Timbre Preference</td>
<td>24</td>
</tr>
<tr>
<td>Multiple Timbre Preference</td>
<td>10</td>
</tr>
<tr>
<td>No Timbre Preference</td>
<td>25</td>
</tr>
</tbody>
</table>

**Test Results—Cohort Two (68 Students)**

In the second cohort, 45 students (25 boys and 20 girls) or 66% demonstrated either single or multiple timbre preferences. Although there is a small overall percentage increase (8%) in the number of students who displayed timbre preferences in this cohort the results are still well below those of Gordon’s own testing.

Consistent with the first cohort, a greater number of students (34, 15 boys and 19 girls) displayed a single timbre preference than those who presented multiple timbre preferences (11, 10 boys and 1 girl). As shown in Table 23 a similar number of students from this cohort (23, 17 boys and 6 girls or 33%) did not display clear preferences for particular instrument timbres.

**Table 23: Gordon Test—Cohort 2**

<table>
<thead>
<tr>
<th>Timbre Preference</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single Timbre Preference</td>
<td>34</td>
</tr>
<tr>
<td>Multiple Timbre Preference</td>
<td>11</td>
</tr>
<tr>
<td>No Timbre Preference</td>
<td>23</td>
</tr>
</tbody>
</table>

Of the 127 students in the study, a total of 79 or 62% displayed either a single or multiple timbre preference.
The purpose in administering the Gordon Test in this study was to determine what impact, if any, timbre preference plays when it comes to achieving successful learning outcomes. If the Gordon Test is to be accepted as a valid and reliable method of instrument selection, then the consequential learning outcomes must be examined carefully.

The first question looked simply at whether timbre preference impacted on the learning outcomes of those students who displayed a preference for the sound of a particular instrument:

Will a student succeed on an instrument if he or she demonstrates a liking for the timbre?

All the students took part in a 10 week trial where they were given weekly small-group lessons on the instruments for which they displayed the highest timbre preferences. Where students displayed an equal timbre preference for two instruments (11 students), they were given a choice. With the exception of only one student who displayed an equal liking for the timbre of the clarinet and the trumpet, the remaining 10 students either displayed an equal score for two woodwind or two brass instruments.

In cases where the only clear timbre preference was for double reeds, which only applied to 3 students, they were offered another woodwind instrument (flute, clarinet or saxophone) with the next highest score. There were 8 students whose only timbre preferences were for tuba. These students were placed on trombones for one of the trial periods.
Of the 79 students across the two cohorts who demonstrated a timbre preference, 66 or 83% of them scored a successful result (A or B) after the 13 week trial period. This statistic could quite easily justify the theory that liking the timbre of an instrument is a reliable indicator of achieving successful learning outcomes.

The second question explored the reverse concept: Will a student perform poorly on an instrument if he or she demonstrates a dislike for the timbre?

According to Gordon, a score of 0, 1 or 2 in the timbre test can indicate a dislike for that particular timbre. A total of 82 students or 65% of the combined cohorts demonstrated at least one score that indicated dislike for particular timbres. A score of zero occurred 30 times with 24 of these concentrated at the extremes of the timbres—A (flute) and G (tuba). The other six scores of zero were spread between oboe (3), trumpet (1) and trombone (2). Of the nine students who scored zero for timbre A (flute), all were boys and of the 15 students who scored zero for timbre G (tuba), 12 were girls.

As the students are never told which instruments the timbres they hear in the test actually represent, it is interesting to note that only 11 students (about 9%) elected to trial an instrument where they had demonstrated a timbre disliking. Six of these students still produced a successful result on the instrument, but only 3 ultimately decided to make that instrument their eventual choice at the conclusion of the trial periods. It is also interesting to note that poor instrumental results (D and E) were not indicative of timbre dislike but came almost exclusively from students who displayed no particular timbre preference or dislike—their scores for all five timbres ranged between 3 and 9. Whether these scores indicate an inability to distinguish between different timbres is not known at the time of writing.
Whilst dislike for single or multiple timbres does not necessarily indicate an unsuccessful outcome, it is clear that students are very unlikely to nominate such an instrument for study. In this sense, the Gordon Test can be seen as a valuable tool for instrument selection as well as an accurate predictor of successful learning outcomes.

As there were a large number of students (48) who did not demonstrate a timbre preference, the following question was pertinent to this study:

How do students perform who do not demonstrate a timbre preference?

Scores between 3 and 9 are not regarded by Gordon as showing a particular like or dislike for any of the timbres. In cases where all scores fell between 3 and 9, it might be reasonable to assume that these students could either be disinterested in timbre, unmusical, not selective or finicky about timbre or perhaps they are simply not hearing a difference between the timbres and therefore have no preferences.

There were 48 students across the two cohorts whose scores for each timbre fell between three and nine. This indicated that they did not exhibit a particular timbre preference for any instrument. The following process aims to establish what impact, if any, having no timbre preferences will have on instrumental learning outcomes. The initial process was to examine which instruments these students were leaning towards as a first preference. This is summarised in Table 24.
Of the 48 students who did not exhibit a timbre preference, 30 (63%) scored a successful result on at least one instrument and 17 (35%) were successful on more than one instrument. Another 17 or 35% of these students did not record a successful result on any instrument during the trial periods. The 23 students in this category whose first choice of instrument was woodwind, 11 (48%) did achieve a successful result. A total of 26 students with no timbre preferences trialled brass instruments with only 5 (19%) managing to achieve successful results.

These results would suggest that having no particular timbre preference is some cause for concern in terms of achieving success on an instrument. With a less than 50% success rate on woodwind and with even less likelihood of success on a brass instrument, percussion might be the obvious choice for this group of students. On an individual basis, it is perhaps more important that this group of students be given an opportunity to trial several instruments.

### Table 24: Instrument Choices of Students with no Timbre Preference

<table>
<thead>
<tr>
<th>Instrument</th>
<th>Initial Preference</th>
<th>Preference after trials</th>
</tr>
</thead>
<tbody>
<tr>
<td>Percussion</td>
<td>18</td>
<td>18</td>
</tr>
<tr>
<td>Saxophone</td>
<td>10</td>
<td>4</td>
</tr>
<tr>
<td>Flute</td>
<td>8</td>
<td>9</td>
</tr>
<tr>
<td>Clarinet</td>
<td>5</td>
<td>8</td>
</tr>
<tr>
<td>Trumpet</td>
<td>3</td>
<td>5</td>
</tr>
<tr>
<td>Trombone</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>No Instrument Preference</td>
<td>2</td>
<td>0</td>
</tr>
</tbody>
</table>
Further to these findings, it was important to separate the instruments to address the following question:

Does timbre preference matter to a greater or lesser degree for different instruments?

To establish some level of importance that should be placed on showing a liking or disliking for particular instrument timbres in relation to learning outcomes, the data for each instrument has been examined separately.

**Timbre A—Flute**

Across the two cohorts 29 students or almost 23% (26 girls and 3 boys) scored a 10, 11 or 12 for timbre A, indicating a liking for the flute timbre. These numbers and gender split are consistent with popular opinion and literature.

The instrument is a very popular choice for learning at school, particularly among girls. (Crozier 2007)

Children like the sound of the flute, the notes first learned lying in the register of a ten-year-old’s voice … The flute appeals more strongly to girls than boys. (Ben-Tovim and Boyd 1985)

If your son is truly attracted to the flute, be aware that the peer pressure might make him hesitant about this. (Cutietta 2001)

There were 27 students or 93% who also scored successful results on the flute (A–14, B–13) after their trial periods. Of the 14 students who achieved A results, their timbre scores were as follows: 10–6, 11–6, 12–2. The almost equal number of students who achieved B results for flute scored as follows: 10–8, 11–3, 12–2. The remaining two students (both girls) who both scored C results for flute had timbre scores of 11 and 12. These statistics for timbre A would certainly indicate that demonstrating a liking for the flute timbre is a good indication of achieving success on the instrument.
**Timbre B—Clarinet**

The timbre of the clarinet can vary greatly between the three different registers of the instrument, and even between individual players. For this reason it may be reasonable to assume that timbre preference might not be an overly important consideration in choosing to study the clarinet. Crease is one author who makes a point of highlighting the variety of sounds that can be produced on the clarinet:

> A child can learn to produce a big sound with little effort, as well as learn how to produce a range of sounds—sweet, piercing, woody, duck-like—depending in which octave she is playing. (Crease 2006)

There were 14 students (9 girls, 5 boys) or 11% who demonstrated a liking for timbre B with scores of 10, 11 or 12 for the clarinet timbre. Three of these students did not study clarinet as they demonstrated an equal or higher score for a different timbre, in the woodwind family: in two cases for saxophone and the other for flute. Of the 11 students who did trial the clarinet, 9 or 82% scored a successful result (A–4, B–5). As with the flute, there were no results lower than a C from students who demonstrated a liking for this timbre. Whilst the number of students who demonstrated a liking for the clarinet timbre was less than that of the flute the success rate of students who did like the timbre of the instrument is still very high. These results would again indicate that the Gordon test is a reliable indicator for student success on the clarinet.

**Timbre C—Saxophone**

As an instrument of first choice, the saxophone has seen a steady rise in popularity over the last decade, as found in these references from Crozier (2007) and Crease (2006).

> The saxophone’s image as a ‘cool’ instrument to play makes it a popular choice for many children. (Crozier 2007)
The saxophone is a good choice for students who like jazz and popular music. (Crease 2006)

With this in mind it is perhaps surprising that only 14 students (5 boys and 9 girls or 11%) demonstrated a liking for Timbre C in the Gordon Test. Perhaps Ben-Tovim and Boyd offer some insight and explanation for this result, especially given that the children in this study probably fall just outside of adolescence.

Of all instruments, the saxophones come closest to the sound of the human voice- not the high piping voice of a child, maybe, but certainly from early adolescence onwards. Boys as their voices break and girls who grow tall tend to outgrow any natural desire to make the clean treble sound of recorder or flute but are attracted to the lower, throaty sound of the alto and tenor saxes. Conversely, few young children or small-bodied girls will naturally like the sound of these instruments. (Ben-Tovim and Boyd 1985)

The gender split here is of some interest, in that almost twice as many girls than boys found this timbre pleasing, but even more noteworthy is that the numbers are an exact statistical match to the clarinet timbre. Two students in this group did not study the saxophone as one scored an equal timbre preference for clarinet and the other for flute. Of the 12 students who studied saxophone, 9 or 75% achieved successful results (A—3, B—6). Again there were no results lower than a C amongst the students who demonstrated a liking for this timbre. Whilst there is a drop in the overall percentage of student achievement the success rate is still noticeably high and would once again find the Gordon Test to be a reliable indicator of success for this instrument.

**Timbre D—Double Reeds**

Whilst double reed instruments were not offered in this study, there were 6 students who demonstrated a liking for this timbre in the testing. Whilst these students were clearly in the minority they can provide important insights into the possible outcomes for students where instruments of timbre choice are unavailable for study. In the cases
of oboe and bassoon this would more than likely be the case due to a combination of cost of resources and staffing availability. As well as anecdotal evidence there is also well-documented evidence to suggest that better results are achieved on these instruments when taken up in an older age group. Ben-Tovim and Boyd, Crease and Crozier all make reference to some degree, to the difficulties associated with learning a double reed instrument:

The oboe is usually picked up by older children who have started on recorder or clarinet … Since the proper lip, tongue and breathing techniques are tricky to acquire, the student needs to be determined and patient to deal with the oboe’s technical challenges … The bassoon is large, long and heavy, so the best starting age is twelve or thirteen. (Crease 2006)

This is perhaps the hardest woodwind instrument for beginners because of its double reed, which is easily damaged, and the sensitivity of the reed in relation to sounding notes … Age 10–11 is probably the earliest starting point … The full-size bassoon is probably more suited to children 10–11, or older. (Crozier 2007)

If your child is vaguely thinking about the oboe, or the school is trying to persuade her to take it up and play in the orchestra, there is only one word of advice: Don’t! … Not an instrument for frail children: the breath control is harder than for any other woodwind instrument and so it must not be attempted unless the child is physically fit, even athletic—and the older the better. Few parents will consider the bassoon. It is a large instrument, not recommended for or chosen by young children. (Ben-Tovim and Boyd 1985)

Whilst this last opinion of Ben-Tovim and Boyd is certainly the strongest viewpoint of the three, in my experience there is a general consensus amongst woodwind teachers that oboe and bassoon are best begun in the early to mid-teen years. From conversations with double reed teachers, many also agree that learning another woodwind instrument prior to the oboe or bassoon is a definite advantage.

The six students who demonstrated a liking for the double reed timbre fell neatly into two categories: in three cases timbre D was a single timbre preference, and the other three students had either an equal or at least one other timbre preference. In the latter
category, two students displayed preferences for woodwind instruments (one flute and the other saxophone) and the other student in this category displayed a liking for timbre G representing the tuba.

This last student mentioned was in a rather unique category, where neither the double reed instruments nor the tuba were being offered in the instrumental program. This female student studied trumpet, clarinet and flute. She scored successful results on both the clarinet and the trumpet, but was unsuccessful on flute, which was an instrument she disliked in the timbre test. Her eventual choice of instrument was in fact trumpet, which although she scored a 5 for in the timbre test, it was her next highest score after double reeds and tuba. This student went on to become quite a proficient trumpet player. Although this is an isolated case it would still appear that liking a brass timbre is a fair indicator of success and that substituting a different brass instrument for one that is not available or practical is a reasonable alternative.

The two students who displayed an equal liking for another woodwind instrument both achieved a successful result on that instrument: one female student with an equal timbre score of 10 for flute and one male student with a score of 11 for saxophone. The students of most interest in the category of liking the double reed timbre are the three students who displayed a single preference for this timbre. In one case, the timbre score was 12, the next highest being 8 for trumpet and 6 for saxophone. He was unsuccessful on both these instruments and eventually settled on percussion where a successful result was achieved. The other two students scored 11 for this timbre. One student proved to be very successful on the saxophone but unfortunately the other was not successful on any of the three instruments he tried, being saxophone, trombone and percussion. These
are obviously fairly isolated cases where 3 students of 127 have displayed a single preference for the double reed timbre. It is unfortunate though that it is impossible to speculate on a result had the opportunity been available for them to study a double reed instrument.

**Timbre E—Trumpet**

Another 14 (12 boys and 2 girls) or 11% of the student body demonstrated a liking for timbre E, and whilst there were no scores of 12 for the trumpet timbre, there were 6 scores of 11 and 8 scores of ten. Given that the students are not told which instrument the timbres represent, the gender split here certainly conforms to the gender stereotypical concept of boys being more attracted to brass instruments. Ben-Tovim and Boyd express a particularly strong view on this instrument:

> The trumpet is a powerful, aggressive instrument for outgoing, dominant and physically strong children, mainly boys. (Ben-Tovim and Boyd 1985)

Of the 14 students who showed a preference for the trumpet timbre, in 8 cases it was their only preference. With the exception of one student whose other timbre preference was for clarinet, the remaining 5 students had an equal or almost equal preference for timbre F representing the trombone. After a trial period on the trumpet 13 or 93% of these students achieved a successful result and one student a C result.

There were 27 students who nominated to trial the trumpet as one of their three choices who did not demonstrate a particular liking for the timbre (scores of between 3 and 9). Of these students 12 or 44% managed to achieve a successful result (A–1, B–11) but only 8 students remained on trumpet as their final choice.
There was only one student who demonstrated a dislike for the trumpet timbre (scores of 0–2) who still elected to trial the instrument. Whilst this student managed to achieve a B grading he did not continue with the trumpet after the trial period.

It would appear that possessing a liking for the trumpet timbre is important in terms of returning a successful learning outcome, perhaps even more so than the woodwind instruments. Further, the use of the Gordon Test to establish a timbre preference for the trumpet can be employed as a reasonably accurate and reliable gauge for success on this instrument.

**Timbre F–Trombone**

There were 12 students (11 were boys) across the two cohorts who demonstrated a liking for timbre F, representing the trombone. As with the trumpet the male students again dominated the liking for this lower brass timbre. This would seem consistent with the findings of Ben-Tovim and Boyd, although their study of this instrument is focussed in the teen years:

> Teenagers, especially tall boys whose voices break early and tall girls who have deeper voices than some of their shorter friends, are similarly attracted by the tenor register of the trombone. (Ben-Tovim and Boyd 1985)

For four students in this group, the trombone timbre was their only preference and they all achieved a successful result on the instrument. One student remained on trombone, one moved to trumpet, one to percussion and the one female student elected to play saxophone after the trial periods.
The remaining 8 students in this category all had an equal or almost equal liking for another brass timbre (either E−trumpet or G−tuba). Two students elected to trial trumpet instead of trombone—one was successful and the other, who rated a C grading, swapped to percussion. The other 6 students all trialled the trombone and achieved a successful result. Five of these students continued with either trombone (3) or trumpet (2) and one moved to percussion. With a success rate of 100% for students who demonstrated a liking for timbre F, this certainly promotes the Gordon Test as a very valuable tool in suitability testing for the trombone.

Timbre G−Tuba

The tuba was not offered in this program as a beginning instrument, not because of the level of difficulty as with oboe and bassoon, but for reasons of instrument availability and cost, size of both students and instrument as well as transportation considerations. For these reasons there are few primary school bands with tuba players. These considerations are supported in the literature:

Although not difficult for a learner player, this instrument may not be a first choice for beginners. Players often move to the tuba after learning the basics on a different brass instrument. (Crozier 2007)

Where the size is a drawback is in carrying it, transporting it on the bus—and finding a place to keep it in the bedroom. (Ben-Tovim and Boyd 1985)

There were 11 boys and 1 girl who displayed a liking for timbre G, representing the tuba. For 8 of the boys, the tuba timbre was their only single preference. Three boys had a slightly higher preference for trombone, on which they were all successful, and the female student’s other preference was for double reeds. This student was very successful on trumpet. Of the 8 boys with a single timbre preference for tuba, four were
successful on trombone, three on percussion and interestingly one boy became a successful flute player.

For students who display timbre G as an only preference it would appear that trombone is, at best, only a reasonable substitute with a 50% success rate. It is undoubtedly a dilemma for both teachers and students alike and is certainly an area worthy of further thought and investigation.

Distinct from instrument preference, this study provides an opportunity to examine timbre preference in relation to gender:

Does gender play a role in timbre preference?

As the students are not told which instrument each timbre represents, The Gordon Test seems to be a reliable way to establish whether or not gender plays a major role within timbre preference. Table 25 shows the frequency of timbre preferences for each instrument separated by gender.

Table 25: Timbre Preferences According to Gender

<table>
<thead>
<tr>
<th>Representative Instrument</th>
<th>Boys</th>
<th>Girls</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flute</td>
<td>3</td>
<td>26</td>
</tr>
<tr>
<td>Clarinet</td>
<td>6</td>
<td>9</td>
</tr>
<tr>
<td>Saxophone</td>
<td>5</td>
<td>9</td>
</tr>
<tr>
<td>Oboe/Bassoon</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Trumpet</td>
<td>12</td>
<td>2</td>
</tr>
<tr>
<td>Trombone</td>
<td>11</td>
<td>1</td>
</tr>
<tr>
<td>Tuba</td>
<td>11</td>
<td>1</td>
</tr>
</tbody>
</table>
A clear preference for timbre A is evident amongst the female students, with the numbers becoming a little more even in relation to the other woodwind instruments, but still weighted towards the female students. Clearly, all three of the brass timbres are more often preferred by male students.

It should be noted that the results for this group of boys are not entirely consistent with existing American studies that tend to show a greater preference for the clarinet timbre amongst boys. This fact could, in part, be attributed to the fact that in the USA, the clarinet is more frequently used as a jazz instrument than in Australia. However, this does not account for the small numbers of students who liked the saxophone timbre. Although this data is hardly surprising, it clearly demonstrates that gender does indeed play a major role in determining timbre preference. It is at this point of analysis where existing studies on timbre preference and gender come to a halt. Whilst there is already a large body of research relating to the timbre preferences of boys and girls (studies include: Kelly 1997, Kuhlman 2008), no research to date has investigated the significance of this data in terms of learning outcomes.

For this to happen, students must be given the opportunity to trial these instruments in a controlled setting where results are carefully recorded and progress is monitored. By giving the students in this study an opportunity to study their timbre preference instruments, the resulting data can be used to establish links between timbre preference and learning outcomes.
There were a large number of cases where the student’s timbre preferences and own choice of instrument did not match. It was therefore important to examine the following question:

What happens when timbre preference and student choice of instrument clash?

A total of 62% of students demonstrated a clear timbre preference. In 34.3% of female students, the first choice of instrument matched their timbre preference, whereas this was only the case in 7.4% of boys. Worth noting is that in 70% of boys who did not exhibit a timbre preference, percussion was their instrument of first choice.

Just as it is possible to score equal timbre preferences for more than one instrument, it is equally possible to score multiple dislikes for the instrument timbres. A score of between zero and 2 indicates, according to Gordon, a dislike for that particular timbre. There was a total of 111 scores between zero and 2 which came from 82 of the students. This would suggest that almost 65% of the students disliked one or more of the timbres. Table 26 compares the frequency of scores that indicate a like or dislike for each of the instrument timbres.

It can be easily established from this data that the dislikes for particular timbres are concentrated at the extremes of the timbre ranges in terms of pitch, which is flute and tuba. It is therefore not surprising that 21 of the 26 students, who indicated a disliking for the flute timbre, also had a liking for one or more of the three brass timbres. The more important issue to examine here is the outcome for students who disliked a timbre but still elected to trial playing that particular instrument.
Table 26: Frequency of Timbre Preference Scores at Extremes of Range

<table>
<thead>
<tr>
<th>Timbre</th>
<th>Frequency of scores between 0–2</th>
<th>Frequency of scores between 10–12</th>
</tr>
</thead>
<tbody>
<tr>
<td>A flute</td>
<td>26</td>
<td>29</td>
</tr>
<tr>
<td>B clarinet</td>
<td>5</td>
<td>14</td>
</tr>
<tr>
<td>C saxophone</td>
<td>3</td>
<td>14</td>
</tr>
<tr>
<td>D d/reeds</td>
<td>18</td>
<td>6</td>
</tr>
<tr>
<td>E trumpet</td>
<td>14</td>
<td>14</td>
</tr>
<tr>
<td>F trombone</td>
<td>13</td>
<td>12</td>
</tr>
<tr>
<td>G Tuba</td>
<td>32</td>
<td>12</td>
</tr>
</tbody>
</table>

Of the 26 students who disliked the flute timbre, 6 (5 boys and 1 girl) trialled the instrument with only 2 (both boys) achieving successful results. One boy did choose flute as his instrument at the end of the trials. Only one of the five students who disliked timbre B trialled the clarinet and she did achieve a successful result. Two of the three students who disliked timbre C did trial the saxophone, scoring a B and C result. Both of these students elected to play saxophone after the trial periods. Only three of the 14 students who disliked timbre E elected to trial the trumpet. Two achieved successful results but did not remain on trumpet after the trials. There were no students who elected to trial the trombone who disliked timbre F.

Students who choose to study an instrument where a timbre dislike has been demonstrated are clearly in the minority. Having established this, for those students who wish to do so, having a dislike for a particular timbre does not necessarily indicate an unsatisfactory outcome and therefore they should be given the opportunity to do so.
Distinct from previous studies, the data gathered in this chapter can be cross-referenced to address the following question:

Are there relationships between academic achievement and timbre preference?

It has already been established that high academic achievers have a good chance of succeeding on a musical instrument. Equally, it has also been established that high academic achievement is not a guarantee of achieving success and therefore should not be used as a sole basis for a selection process. Looking at the timbre preferences of the students in relation to their academic results could provide some useful guidelines where other testing methods might not be available or practical.

Given that timbre preference is quite a reliable indicator of success, and that the most popular literature makes numerous references tying intellect to various instruments the nature of this data is of educational interest:

The flute suits a wide range of mental ability: comparatively slow learners happily spend months, even years, learning to play simple tunes beautifully; quick learners race ahead … (Ben-Tovim and Boyd 1985)

These instruments (saxophones) suit children who may have been labelled “casual” or “fails to concentrate” but are by no means dull. (Ben-Tovim and Boyd 1985)

You must be alert to play the trumpet: the music has more notes to read and play than the other brass parts. (Ben-Tovim and Boyd 1985)

Table 27 displays timbre preference in relation to the various academic abilities of the students.
Table 27: Timbre Preferences in Relation to Academic Ability

<table>
<thead>
<tr>
<th>Timbre</th>
<th>High academic ability A/B</th>
<th>Average academic ability C</th>
<th>Below average academic ability D/E</th>
</tr>
</thead>
<tbody>
<tr>
<td>A flute</td>
<td>13</td>
<td>10</td>
<td>4</td>
</tr>
<tr>
<td>B clarinet</td>
<td>5</td>
<td>8</td>
<td>0</td>
</tr>
<tr>
<td>C saxophone</td>
<td>7</td>
<td>7</td>
<td>1</td>
</tr>
<tr>
<td>D d/reeds</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>E trumpet</td>
<td>4</td>
<td>8</td>
<td>3</td>
</tr>
<tr>
<td>F trombone</td>
<td>3</td>
<td>9</td>
<td>0</td>
</tr>
<tr>
<td>G tuba</td>
<td>1</td>
<td>6</td>
<td>4</td>
</tr>
<tr>
<td>No preference</td>
<td>9</td>
<td>19</td>
<td>19</td>
</tr>
</tbody>
</table>

The data suggests that students with no timbre preference, particularly those who scored straight 6s for all timbres were average or below average academic achievers. Around 20% of high academic achievers have no timbre preference, which is also the case with almost 30% of average academic achievers. This percentage increases quite dramatically to 56% in low academic achievers. As has already been discovered, average and below average academic achievers are quite capable of achieving success on a musical instrument. It is therefore very important that these students be given the opportunity to trial several instruments. Any advice given to students and parents based on this type of data would need to be done carefully and sensitively.

There is much discussion and criticism around current national literacy and numeracy testing (NAPLAN—National Assessment Program Literacy and Numeracy) and how the information is being used, particularly in the primary years. It should be noted again
here that the academic results used in this study were provided by the classroom
teachers and used for internal reporting. Musical decisions based around a “snap-shot”
of a student’s academic ability should be avoided or at least approached with a high
degree of caution. In answering the following question, Ben-Tovim and Boyd’s research
is mostly consistent with the findings of this study.

Are high academic achievers attracted to particular timbres?:

Quick learners and impatient children enjoy the rapidity of progress on the clarinet … it
is harder to read and play clarinet music than music for flute … (Ben-Tovim and Boyd
1985)

Most trombonists are bright and quick-witted and play more than one kind of music
with equal pleasure. They are good “all-rounders”. (Ben-Tovim and Boyd 1985)

The data does suggest that average and below average academic achievers are far less
likely to display a timbre preference than high academic achievers. We can also see that
the timbre preferences of high academic achievers are more concentrated in the
woodwind instruments. The timbre preferences of average academic achievers are fairly
evenly spread between woodwind and brass and the same can be said for low academic
achievers—with the exception of the clarinet and trombone timbres.

Are there relationships between timbre preference and musical aptitude?

As we are now aware, pre-existing musical aptitude can be advantageous in the study of
a musical instrument, but it is by no means essential for achieving success. Also worth
restating is that students with high academic abilities are not necessarily the same ones
who possess high musical aptitudes. With these points in mind it is interesting to
examine which timbres the students are attracted to in relation to their musical
aptitudes. Table 28 draws on the data from these two areas in order to establish any links or trends.

**Table 28: Timbre Preferences in Relation to Pitch and Rhythmic Skills**

<table>
<thead>
<tr>
<th>Timbre</th>
<th>High musical aptitude</th>
<th>Average musical aptitude</th>
<th>Below average musical aptitude</th>
</tr>
</thead>
<tbody>
<tr>
<td>A flute</td>
<td>22</td>
<td>7</td>
<td>1</td>
</tr>
<tr>
<td>B clarinet</td>
<td>11</td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td>C saxophone</td>
<td>8</td>
<td>5</td>
<td>1</td>
</tr>
<tr>
<td>D d/reeds</td>
<td>1</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>E trumpet</td>
<td>9</td>
<td>4</td>
<td>1</td>
</tr>
<tr>
<td>F trombone</td>
<td>9</td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td>G tuba</td>
<td>7</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>No preference</td>
<td>20</td>
<td>19</td>
<td>9</td>
</tr>
</tbody>
</table>

The data shows that around 48% of students with high musical aptitude are attracted to the woodwind timbres in order of preference from high to low—flute, clarinet and saxophone. Almost 30% prefer the brass timbres and the liking is spread fairly evenly across these instruments. Of the students with average musical aptitude, 37% preferred woodwind timbres, with the highest number again for flute, and about 20% of preferences were evenly distributed amongst the brass timbres. Of the 15 students who tested below average in musical aptitude, timbre preferences were fairly evenly spread. It is interesting to note that no timbre preferences were scored in this group for either clarinet or trombone which is an exact match to the data relating to the below average academic students. This data also suggests that almost one quarter of students who display high musical aptitude may not display any timbre preference. This rises to 40%
in students displaying average musical aptitude and jumps to 60% in students with below average pitch and rhythmic skills.

It is important that information of this nature is not used in isolation, as it could quite easily become the basis for including or excluding students from instrumental music programs. It could however be used as a guide in selection processes as this type of information would be readily available from classroom music teachers. It could also be used in conjunction with other testing methods when building student profiles to assist with instrument selection.

**Summary and Conclusions**

One immediate issue that could be problematic if relying solely on this testing method (The Gordon Test), for instrument selection is that the beginning student is unlikely to be able to produce the desired sound or tonal quality on commencing the instrument. This would be particularly true in the case of double reed instruments (which were not offered in this trial), where it is not uncommon for students to take many months or even years to produce a tonal quality anywhere close to an accomplished player.

Arguably, and to varying degrees, the same could be said for any or all of the other instruments offered in this program. Some students took several weeks to produce a sound on the flute, which many found frustrating. Saxophone was an instrument that a number of students found difficult to control and the sound produced was quite raucous and grating for many weeks. The length of time students are prepared to spend trying to produce the desired sound will vary greatly between individuals. Following are several indicative comments from student interviews:
“I couldn’t get a sound at first [on the flute] but when I did I liked it”
“The saxophone was really loud”
“I found it hard to blow without puffing my cheeks” [trumpet]
“sometimes it worked and other times it didn’t” [trumpet]
“once I could cover the holes [on the clarinet] properly the sound was good”

Some of these student comments refer to the issues pertaining to physical suitability which will be discussed in a later chapter. The ability to form the correct playing embouchure (in the case of woodwind and brass), being a suitable size to hold and support the instrument successfully and a general feeling of comfort with the instrument, rather than simply liking the timbre all seemed to be major factors contributing to success on the instruments. Students who were unable to produce the desired sound on a particular instrument, usually because they were unable to form a successful embouchure, became discouraged within the first few weeks of the trial, even if the instrument was their initial first choice or highest timbre preference.

The resulting data in this chapter would indicate that using timbre preference testing, as a definitive method of instrument selection is certainly interesting but does have limitations in providing accurate predictions of learning outcomes. The Gordon Test will provide instrumental teachers with a large amount of data that can be used in a variety of ways. The data gathered is best used as a general guide or indicator of the individual student’s current tastes, and in this sense, it is a worthwhile process.
Chapter 5: Study D- Student Choice

The “open slather” approach—will letting students decide for themselves produce successful outcomes?
Background and Rationale

This chapter is principally concerned with exploring and analysing the resulting outcomes when students are left to their own devices in choosing a musical instrument. As well as considering which instruments the students choose to play, the reasoning behind the decision making process, the influences that play a role in this process and the longer term effects of this as a method of instrument selection will be examined. As a teacher, I have noticed an increasingly prevalent attitude amongst parents of primary school age students who adopt a “just want him to be happy” or “just let her do what she wants to do” approach.

The resulting data from this method will give substantial insight into whether or not it is feasible to let students play the major role in instrument selection. Recent Australian and American research would suggest that the decision making process of the pre-adolescent can be rather unreliable:

Sometimes instrumental choices make sense, and sometimes they are purely intuitive on the part of the child. (Turner, 2004)

It is important to be aware that the brain’s centre of reasoning and problem-solving, the prefrontal cortex, is the last to mature, and the brain is not fully developed until the early 20s. To compensate for this shortfall, the adolescent relies heavily on another area of the brain, the amygdala, the primitive and instinctive part, which creates a tendency to react automatically. In other words, adolescents do not have the same ability as adults to control their impulses and make sound decisions, which in turn means there is no point in judging their actions from an adult perspective—to do so is both unfair and unhelpful, and will inevitably lead to disappointment. (Carr-Greg, 2006)
Method

Questions to be examined within this method will include:

Would using this method result in a viable spread of instruments suitable for a concert band program?

What are the reasons for students choosing a particular instrument?

Will students perform well on an instrument of their own choice?

What is the expected retention rate of students using this method?

Does the retention rate differ between instruments?

What makes students change their mind about instrument choice?

Whilst the first question does not necessarily relate to successful results or finding the most suitable instrument, it is important to gauge in a school setting:

Would using this method result in a viable spread of instruments suitable for a concert band program?

As stated in Chapter One, the two cohorts of students in this study commenced and completed the 2-year trial instrumental program one year apart. For this reason they have been examined separately as each cohort was expected to form a beginner concert band. As an additional point of interest, the choices of instruments have also been separated by gender. This issue will be more closely examined at a later stage in the study.
All the students were given the opportunity to nominate an instrument of first choice on which they were guaranteed one term (approximately 10 weeks) of study. The range of choices for cohort one can be seen in Table 29.

### Table 29: Cohort 1 (59 students)—Instruments of First Preference

<table>
<thead>
<tr>
<th>Instrument</th>
<th>Boys</th>
<th>Girls</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flute</td>
<td>0</td>
<td>17</td>
<td>17</td>
</tr>
<tr>
<td>Clarinet</td>
<td>4</td>
<td>3</td>
<td>7</td>
</tr>
<tr>
<td>Saxophone</td>
<td>6</td>
<td>8</td>
<td>14</td>
</tr>
<tr>
<td>Trumpet</td>
<td>2</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>Trombone</td>
<td>2</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>Percussion</td>
<td>11</td>
<td>1</td>
<td>12</td>
</tr>
<tr>
<td>No Preference</td>
<td>2</td>
<td>2</td>
<td>4</td>
</tr>
</tbody>
</table>

The instrument choices of Cohort One revealed a distinct preference for flute amongst girls, a strong desire to play percussion amongst boys, but showed the saxophone to be almost equally popular amongst both genders. The clarinet as a preference did not appear to display any gender bias in students’ choices, but it was certainly not a popular choice amongst the student body. The brass instruments were even less popular.

With a distribution of numbers such as this, and even if the students are largely successful on their chosen instruments, the process of forming a viable concert band with any reasonable balance becomes almost impossible. An oversupply of flutists is workable due to nature of the sound; however, the same theory cannot be applied to beginner saxophonists. The brass instruments would be particularly under subscribed in
this scenario and trying to accommodate more than 4 or 5 percussionists in the same concert band can also be problematic.

Exactly one year later and under the same conditions, each student in the second cohort was asked to nominate a first choice of instrument. The resulting choices are displayed in the Table 30.

**Table 30: Cohort 2 (68 students)—Instruments of First Preference**

<table>
<thead>
<tr>
<th>Instrument</th>
<th>Boys</th>
<th>Girls</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flute</td>
<td>4</td>
<td>12</td>
<td>16</td>
</tr>
<tr>
<td>Clarinet</td>
<td>2</td>
<td>5</td>
<td>7</td>
</tr>
<tr>
<td>Saxophone</td>
<td>5</td>
<td>7</td>
<td>12</td>
</tr>
<tr>
<td>Trumpet</td>
<td>4</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td>Trombone</td>
<td>4</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td>Percussion</td>
<td>22</td>
<td>1</td>
<td>23</td>
</tr>
<tr>
<td>No Preference</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

The pattern of choices in this cohort was obviously very similar to the first. Whilst four boys in this cohort nominated the flute as their first preference, it was clearly again more popular amongst the girls. The saxophone was once again a reasonably popular choice with both boys and girls. In this cohort, percussion was even more popular, with more than 50% of the boys nominating percussion as their first preference. The small number of students nominating clarinet and brass was also consistent with the numbers in the first cohort.
Exactly the same problems for forming a viable concert band emerged with the instrument choices of the second cohort, with the major difference being an even greater oversupply of percussionists.

With a view to establishing some insight into the thinking process that shaped the student’s decisions on instrument choice, all were asked to try and explain how or why they decided on their particular first choice of instrument.

What are the reasons for students choosing a particular instrument?

A large number of students across both cohorts were unsure as to what made them choose their first preference of instrument. It is reasonable to assume here that some students may not have wanted to give their reason or were unable to explain or articulate their reason. Some reasons that were given, in order of the most frequently occurring, included:

- wanting to play in a pop/rock band (26)
- having a friend who wants to play the instrument (14)
- liking the appearance of the instrument (9)
- parents wanting the student to play the instrument (9)
- family already owns a particular instrument (6)
- portability of instrument (6)
- inspired by famous artist (Popular Australian jazz trumpeter and multi-instrumentalist James Morrison was mentioned 4 times)
- liking the sound of the instrument (3)
- no identifiable reason (46).
One response that is also worth mentioning, having come from a child who is now quite an accomplished player, was:

“I can imagine myself playing the flute”.

Considering the number of students whose first preference of instrument was percussion, it is not surprising that the most frequently occurring answer was the desire to play in a rock band. This would almost certainly be the genre of music to which these children were most frequently exposed, either intentionally or through various media.

Having a friend wanting to play the same instrument, the next most common response, was again not surprising in this age group. This reasoning can be driven by social desires, peer group pressure, or a combination of both. The same could be said for liking the look of an instrument, rather like a piece of clothing or an accessory. Portability of the instrument as a reason for choice may well have been parent driven.

Parental input can be motivated by a variety of factors. In this college there is a high percentage of what is commonly referred to as “first time private school parents”. These parents did not attend a private school themselves, but have chosen to send their children to such a school, in order to provide opportunities they may have missed. In many cases, these parents were never presented with the opportunity to study a musical instrument, either in school or privately. This scenario can result in decisions being based on the desires of the parent, rather than the student.
Crozier aims to outline a clear distinction between encouraging and forcing a child to play a musical instrument:

If left to their own devices, some children never consider learning to play a musical instrument. For others, the idea comes naturally, perhaps stimulated by seeing or hearing instruments at school, on screen or in the home. Parents who never took the opportunity to learn, or dropped lessons, may project their own regrets on to children. (Crozier, 2007)

In cases where there is an instrument already owned by the family, students can be convinced or persuaded to start this instrument, often for practical or financial reasons, or a genuine desire to please their parents. The latter can often be the case where a parent, grandparent or older sibling played that particular instrument.

Being inspired by a popular artist could possibly fall into the “I want to be a rock star” category, but it does seem to have involved a little more thought process. Similarly, students who said they wanted to play an instrument because they liked the sound, had presumably given this some degree of thought, and therefore on the surface it does seem more logical than some of the other reasons.

Whilst there were quite a number of reasons given by the students for wanting to play a certain instrument there was nothing particularly surprising or profound amongst them. Whatever the reason, and in many cases (46) there was no identifiable reason other than just wanting to play a particular instrument. The most important factor is to determine whether this method is valid in terms of successful outcomes. This will be addressed in the following question.
Will students perform well on an instrument of their own choice?

This is certainly the most important question to be examined in this method. If letting students have “free choice” on instrument selection is a viable approach, (despite ignoring the huge disparity in numbers between instruments), the results achieved need to be successful. To more effectively report on the results achieved by the students on their instruments of first choice, the numbers in both cohorts have been combined.

As in all the methods examined thus far, the results were recorded and graded as follows: successful results (A and B), average result (C) and unsuccessful results (D and E). The specialist instrumental teachers recorded these results after one term of lessons, using the same criteria guidelines as stated in chapter one (Figure 2).

Table 31 shows the total number of students who studied each instrument as their first preference and a breakdown of the successful, average and unsuccessful results for each of the instruments. In total, 123 of the total 127 students gave an instrument preference. Just over 60% of the total number of students achieved a successful result on their instrument of first choice. Whilst this percentage is not alarmingly low, it does fall rather short of what could be regarded as a desirable outcome.
Table 31: Results of Combined Cohorts on Instruments of First Preference

<table>
<thead>
<tr>
<th>Instrument</th>
<th>Total number of students</th>
<th>Successful results</th>
<th>Average results</th>
<th>Unsuccessful results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flute</td>
<td>33</td>
<td>24</td>
<td>8</td>
<td>1</td>
</tr>
<tr>
<td>Clarinet</td>
<td>14</td>
<td>10</td>
<td>4</td>
<td>0</td>
</tr>
<tr>
<td>Saxophone</td>
<td>26</td>
<td>14</td>
<td>5</td>
<td>7</td>
</tr>
<tr>
<td>Trumpet</td>
<td>8</td>
<td>6</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>Trombone</td>
<td>7</td>
<td>4</td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td>Percussion</td>
<td>35</td>
<td>16</td>
<td>15</td>
<td>4</td>
</tr>
</tbody>
</table>

The success rate differed markedly between the most popular instruments. Whilst the students who studied flute as a first preference were 73% successful, this success rate dropped dramatically with the saxophone to 54%. Percussion was the most popular choice of instrument but the success rate here was only 46%. Whilst only 8 students studied the trumpet as their first preference, the success rate was the highest at 75%, followed by clarinet at 71% and trombone at 57%.

It is difficult to establish or even surmise why the different instruments produced such varying rates of success. The relative degree of difficulty between different instruments could be disputed, but in this situation there is little to be gained from such an argument. Nevertheless, even if all the students who gained a successful result on their first choice of instrument were to continue studying that instrument, a concert band program would still be difficult to balance with the distribution of these numbers.
The following question is arguably just as important as the previous question, particularly in a school setting:

What is the expected retention rate of students using this method?

It was not surprising to learn that students who find that they are only average, or below average at playing an instrument, are also reluctant to persevere with it for any length of time. Even if the fairly modest percentage of students who achieved a successful result on their first choice of instrument were to continue, the resulting program would be severely depleted. The reality is that even those students who excel at a particular instrument will not always want to continue.

Table 32 shows the actual number of students who choose to remain with their initial first choice of instrument after having lessons for one term. The retention rate seen in this data would be a serious cause for concern for any primary beginner band program. Of the 55 students in Cohort One who nominated a first choice of instrument, only 30 (55%) decided that this instrument was still their first preference after one term of study. In the larger second cohort where all students gave a first choice of instrument only 31 (46%) of the 68 students were still happy with their initial first choice of instrument after one term of study.

When comparing the two groups of continuing students (columns 2 and 4 in Table 32), it is obvious that the numbers and balance of instruments is not ideal for forming a concert band. With just below 50% of all the students electing to continue with their initial first choice of instrument, over a period of two years, the long-term impact on a school music program becomes quite crucial.
Table 32: Numbers of Students Electing to Continue on First Choice of Instrument

<table>
<thead>
<tr>
<th>Instrument</th>
<th>Starting cohort 1</th>
<th>Continuing cohort 1</th>
<th>Starting cohort 2</th>
<th>Continuing cohort 2</th>
<th>Total continuing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flute</td>
<td>17</td>
<td>10</td>
<td>16</td>
<td>9</td>
<td>19</td>
</tr>
<tr>
<td>Clarinet</td>
<td>7</td>
<td>3</td>
<td>7</td>
<td>4</td>
<td>7</td>
</tr>
<tr>
<td>Saxophone</td>
<td>14</td>
<td>6</td>
<td>12</td>
<td>4</td>
<td>10</td>
</tr>
<tr>
<td>Trumpet</td>
<td>3</td>
<td>1</td>
<td>5</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Trombone</td>
<td>2</td>
<td>2</td>
<td>5</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>Percussion</td>
<td>12</td>
<td>8</td>
<td>23</td>
<td>11</td>
<td>19</td>
</tr>
</tbody>
</table>

In order to establish whether the various instruments attracted students with a higher or lower level of long-term commitment, the following question was examined:

Does the retention rate differ between the different instruments?

Across the two cohorts there were 33 students who nominated the flute as their initial first choice of instrument. Even though 24 (almost 73%) of these students achieved a successful result on the instrument, only 19 (approximately 57%) actually liked the flute enough to decide to continue with it after the initial trial period. Of the 14 students who altered their preference, seven changed to clarinet, four to saxophone, two to trumpet and one chose trombone.

Despite a success rate almost equally as high as the flute, exactly half of the students who initially wanted to play the clarinet continued after their trial period. Three moved to brass (one trumpet and two trombones), two changed to percussion, and the remaining two chose flute and saxophone. Like the flute, the saxophone was a popular
choice of instrument, with 26 students nominating it as their first choice. With only ten students (38%) continuing with saxophone, this instrument had one of the highest dropout rates. Of the 16 students who changed their minds about the saxophone, five moved to each of flute and percussion, three to clarinet and three to brass (two trumpets and one trombone).

As instruments of first preference, the trumpet and trombone did not rate highly amongst the students. Despite having the highest result success rate of 75%, only one of three students in the first cohort stayed with the trumpet, the other two moved to saxophone and trombone. In cohort two, five students chose trumpet and only one continued. This meant that across the two cohorts the trumpet rated a retention rate of only 25%. Whilst only seven students chose the trombone as their first choice, four students (57%) continued. Three students swapped preferences between the brass instruments, whilst the rest moved to flute, saxophone and percussion.

In Cohort One, percussion returned the highest retention rate with eight (67%) of the 12 students continuing. The other four students all moved to brass instruments. In Cohort Two the retention rate for percussion was a much lower 48%, with seven students moving to brass and five to woodwind instruments. The total retention rate for percussion across the two years was 19 students or 51%, which was very similar to most other instruments.

Achieving a successful result on an instrument is certainly one contributing factor in student retention. It is clearly disappointing for students to find that they are unable to play the instrument they had originally selected as a first preference, or that it was not
what they had expected, or hoped for. These findings indicate that success is by no means the only contributing factor that drives or encourages students to continue playing a particular instrument.

In order to ascertain an understanding of why students want to change from, or give up playing a particular instrument, the following question was examined:

What makes students change their mind about instrument choice?

The most frequently occurring reasons given by students who changed their first preference of instrument after a trial period can be summarised as follows:

- couldn’t play it
- better at or liked a different instrument more
- difficult to hold or just uncomfortable
- didn’t like the sound

The most prevalent factor in students changing instrument preference was their perception of not being able to play it. In the case of woodwind and brass, this perception included, not being able to form or sustain the correct playing embouchure, not being able to cover the holes sufficiently (clarinet), or struggling to produce the sound. In the case of percussion this usually meant a lack of co-ordination between the hands, making the sticking patterns awkward and unnatural.

Ben-Tovim and Boyd place a strong emphasis on the importance of finding the right instrument for each student:
Most physically and mentally normal children have musical potential far beyond what is necessary to learn to play the right instrument. However, a child set to learn a wrong instrument has to overcome a whole complex of unnecessary physical, mental and emotional handicaps. Taken together, these obstacles can more or less guarantee eventual failure on the instrument. (Ben-Tovim and Boyd, 1985)

In this program the students trialled two other instruments as well as their first choice. This meant that a large number of students discovered that they were more successful with, or simply liked another instrument more than their initial first choice. This method will be examined in detail in the following chapter.

Finding the instrument uncomfortable or difficult to hold was the next most common reason for wanting to change preference. In order of the most frequently occurring, these instruments were as follows: saxophone, trumpet, flute and clarinet.

A number of students found the size of the alto saxophone quite daunting. Whilst the neck strap does support the weight of the instrument, achieving this balance was often time consuming and frustrating for the students and some just found the feel of the neck strap uncomfortable. Another complaint, which was also common to the clarinet, was the feel of the reed on the tongue and the sensation of the vibration when blowing.

Many students found that the playing posture required for both the flute and trumpet was too physically demanding. Other problems were embouchure related, and whilst most students could make a sound on the trumpet, achieving a satisfying range was difficult. There were also some students who were unable to produce a sound on the flute at all after a whole term, which proved to be an entirely unsatisfying experience. Apart from the reed complaint mentioned earlier, the other difficulty encountered with the clarinet was in reaching and covering the finger holes.
Not liking the sound of the instrument was most common with saxophone and trumpet. Whether or not these students knew what the instruments should sound like beforehand is hard to determine. As the sound produced is heavily reliant on their ability to achieve the correct playing techniques, this factor could be grouped with the most frequently occurring reason of not being able to play the instrument.

**Summary and Conclusions**

As a method of instrument selection, letting students simply decide from the start which instrument to play, is probably the most inadvisable method examined in this study. Not only is there likely to be huge unevenness in numbers studying the different instruments, making a band program difficult to coordinate, but also more importantly the dropout rate in an instrumental program is likely to be alarmingly high. Having trialled this method, this study has proved that only a relatively small percentage of students will decide on a suitable instrument, when left to their own devices. This fact is consistent with the literature which identifies choosing the wrong instrument as the most prevalent factor in dropout rates amongst instrumentalists:

> Choosing the wrong instrument was the most common factor in musical failure—not lack of musicality, or musical potential. (Ben-Tovim and Boyd, 1985)

All of this aside, the process of letting the students have free choice on instrument selection was certainly a valuable learning experience, both for the students and for the teachers involved in this program. The process of running a trial program of this kind within a school setting might be seen by some as a luxury, however given the findings, it could well be promoted as a necessity. Nagel acknowledges the difficulty in finding the correct balance between choice and structure in an educational setting:

> The brain’s hard-wiring changes in response to experience. The irony … too much freedom and independence does not match the brain’s innate patterning mechanisms which look for structure and stability … a difficult balancing act! (Nagel, 2005)
If the facility and resources exist within a school to allow students a trial period on their first choice of instrument and also the option of changing if things don’t go to plan, then this method certainly provides a valuable opportunity and experience. Where this is not possible, using a method that provides far more assistance and guidance to the students is certainly advisable. Given that schools depend on student numbers in beginner band programs to feed into the more advanced ensembles, leaving the choice of instrument solely in the hands of the students clearly does not offer the most desirable outcomes.
Chapter 6: Study E- Instrument Immersion—Rotational Program

The “Smorgasbord”: Does a trial and error approach represent value in instrumental learning outcomes?
Background and Rationale

A currently popular trend in educational settings, particularly in the late primary and early years of secondary schooling, is to offer students a trial period in a variety of subject areas. In today’s education system there are more curriculum choices than ever before, and this “choice factor” would appear to be on the increase. On the positive side, this approach exposes students to a wider range of areas and possibilities and gives opportunities for self-discovery of their own particular strengths and flair. Another valid viewpoint arguing against the “try before you buy” method is that students may develop an unproductive work ethic, that is one which lacks perseverance. The idea that such programs may promote an attitude of quitting when things get difficult, in favour of moving on to something else, is a valid and genuine concern. Crozier identifies this trend as a concern:

Part of the process of growing up is discovering new things, being drawn to them, and then, just as suddenly, leaving them for the next new thing. When learning an instrument this isn’t helpful. (Crozier, 2007)

Some teachers expressed a concern that this program might be wasting a year when traditionally students would be studying the one instrument; in spite of this, all the teachers were willing to trial the program.

By including the immersion method in this study, the notion can be explained that a program based on a rotational system in the beginning years of learning an instrument, might actually alleviate the “drop out” phenomena in the later years of instrumental study. Although there is no study known to this author at the time of writing which documents the outcomes of these programs, Crozier (2007), Cutietta (2001) and Turner (2004) would seem to support the concept.
It’s a good idea to persevere with lessons for 8–12 months, or two to three school terms, to get to know whether the instrument is right for you. Even if it isn’t, there is no shame in moving on to a different instrument. Only in this way will you find exactly the right match. (Crozier, 2007)

After you choose, monitor the choice. If it’s clearly a mismatch, let the child switch. I am a firm believer in allowing children to change instruments (once or at most twice) in the first year or two of study. (Cutietta, 2001)

Everyone has to start somewhere but many of us don’t end up with the same instrument we began playing in grade school. Your children need to find appropriate gateway instruments…They can refine their choices as they get older … (Turner, 2004)

Some schools run a smaller version of an immersion program for the purpose of recruiting students into band programs. These operations are condensed into a single day event or even just a few hours. Teachers will see each student for several minutes and assess their suitability to the various instruments. Crease suggests there is merit in these events as an introduction to instrumental study:

Whether the children have five minutes or thirty minutes on an instrument, these introductions can work magic by triggering a child’s desire to play a specific instrument and to study music. (Crease, 2006)

The instrument immersion program in this study is an application of the approach used in many LOTE (languages other than English) programs where students spend a whole school year studying a different language each term. With the growth and expansion of curriculums, this method has also been used in conjunction with other subjects such as Drama, Dance, Classroom Music, Art, Hospitality and Manual Arts subjects. Here the languages or subjects have been substituted for musical instruments, but the objectives are largely the same: to maximise opportunities and discover where each student excels.

Resourcing and implementing this type of program in schools could pose some immediate concerns in terms of instrument supply, staffing and physical space. If the timeframe for the delivery of an instrumental program is very restricted for example, all
lessons having to take place on the same day, staffing and space provision can be problematic. With regard to resourcing the program with instruments, there now exist companies in Australia who offer musical instrument hire systems, which are competitive, cost effective and work successfully with an immersion program. School libraries can be approached to purchase small class sets of tutor books that can be reused for each rotation, and also later in subsequent years. The effectiveness of this method may well outweigh the initial set up costs with the benefits it offers the students and the long-term health of the schools’ instrumental music programs.

The responsibility for an entire year level of students being required to learn a musical instrument for a compulsory period of three years presents both challenges and opportunities. Schools where instrumental music is part of the core-curriculum are on the increase in Australia. Where these programs run for more than just one year, it is especially important to find an appropriate instrument for each student. Having to persevere with an unsuitable instrument for any length of time can place enormous strain on student–parent, student–teacher and parent–teacher relationships.

In order to establish whether an instrument immersion program produces successful learning outcomes, the following questions will be examined:

What was the participation rate of students trying the different instruments?

What was the commitment level in terms of effort from the students?

Will students succeed on an instrument that is neither their choice nor timbre preference?

Are students likely to decide on an instrument that they did not initially choose?

What are the success rates for students in the following two years of the compulsory program once their instrument has been established?
Was the resulting spread of instruments viable for a successful concert band program using this method?

What is the likely retention rate of students in an instrumental music program after the compulsory period has elapsed?

What was the student response to the program?

**Method**

The immersion program was structured to coincide with a school year, consisting of four terms, or periods of nine to ten weeks. The students would spend one term on their instrument of first choice, one term on the instrument for which they demonstrated a timbre preference (if this was different from their first choice) and one term on a third instrument. In term 4, the students would return to the most suitable instrument of the three already studied. The only other parameter that was specified in this program was that the three instruments studied by each student should incorporate at least two of the three different instrument families on offer: woodwind, brass and percussion. It was also stated that before instrument selections were made, it might not be possible to study both clarinet and saxophone, or trumpet and trombone, as only two instrumental staff were responsible for the delivery of lessons on these four instruments.

Each class of students was divided into four smaller groups of no more than seven students, with an average class size of six. Four lessons took place concurrently: flute, clarinet or saxophone, trumpet or trombone and percussion. In this format, the students had a lesson on the same day and at the same time each week.

At the conclusion of every trial period each instrumental teacher completed one section of the following purpose-designed student profile sheet. The grading criteria were
included on the profile sheet for ease of access and marking for the instrumental music
staff. In the following example (Figure 5), the name of the student and the teachers has
been altered, however, the instruments, gradings and comments have not been changed.

![Student Profile Form]

Figure 5: Student Profile Form
This system ensured that all the information gathered on each student during this program was stored in the one place. Staff were actively encouraged to use the comment space and this extra information proved valuable at the conclusion of the program. If students needed assistance with their decisions, or if parents had queries on how their child had performed on a particular instrument, the information was easily accessible. In this example, the student had clearly performed best on the trumpet, making the decision quite clear cut. Where students performed equally well on two, or occasionally three instruments, more consultation was needed before a final decision could be reached.

What was the participation rate of students trying the different instruments?

The following table shows the number of students that tried each instrument across the three-term duration of the program. As shown in Table 33, this method ensures a strong level of exposure to the instrument families as well as presenting each student with multiple opportunities.

**Table 33: Number of Students Trying Each Instrument**

<table>
<thead>
<tr>
<th>Instruments</th>
<th>No. of students selecting Cohort 1</th>
<th>No. of students selecting Cohort 2</th>
<th>Total combined percentage of students</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flute</td>
<td>27</td>
<td>39</td>
<td>52%</td>
</tr>
<tr>
<td>Clarinet</td>
<td>33</td>
<td>32</td>
<td>51%</td>
</tr>
<tr>
<td>Saxophone</td>
<td>30</td>
<td>36</td>
<td>52%</td>
</tr>
<tr>
<td>Trumpet</td>
<td>28</td>
<td>25</td>
<td>42%</td>
</tr>
<tr>
<td>Trombone</td>
<td>18</td>
<td>21</td>
<td>31%</td>
</tr>
<tr>
<td>Percussion</td>
<td>41</td>
<td>51</td>
<td>72%</td>
</tr>
</tbody>
</table>
Percussion was obviously well subscribed; however, this could be expected for several reasons. It was firstly listed on its own as an instrument family, it was a very popular choice with boys, and it is also reasonable to assume that some girls tried percussion in favour of a brass instrument. Trombone was clearly the least preferred instrument to trial, but with only seven students across both cohorts nominating it as a preference at the outset, this method can only be helpful in generating enthusiasm for the less popular instruments. There was some avoidance of brass instruments by female students, just as flute was not a popular choice amongst male students. It is also fair to say that students in general were quite willing to put aside traditional gender associations with certain instruments, when the initial commitment was for one term of study.

As the students would be trying instruments they had not necessarily nominated as a choice, it was important to examine the following question:

What was the commitment level in terms of effort from the students?

One possibility that was of concern to the staff involved in delivering this program was that students would only show an interest or display effort on instruments that they had nominated as wanting to play. Whilst students were assured of a trial on their first choice of instrument, there were cases where it was not possible to timetable all three of the choices for some students. In these cases, the students were placed on instruments in classes that were not yet fully subscribed to, so as to balance the group numbers.

With the aim of alleviating some of the concerns relating to effort, and at the same time generate enthusiasm for the program, the students were addressed in class groups at the commencement of the program. During this session, the following points were stressed:
They would definitely have one term on their first choice of instrument.

They may not necessarily study the instruments in order of preference due to timetabling and class size considerations.

Commitment to each instrument was for one term only.

The program was an opportunity to experience a variety of instruments.

They might really enjoy or be good at an instrument they would otherwise not have thought of playing.

If students were able to view the opportunities the program had to offer in a positive light, the desired outcome was that they would give maximum effort to all three instruments for the duration of the three-term trial period.

Table 34 shows the results achieved by the first cohort of students in each term of the three-term trial period.

**Table 34: Term Results—Cohort 1**

<table>
<thead>
<tr>
<th>Result</th>
<th>Term 1</th>
<th>Term 2</th>
<th>Term 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>16</td>
<td>18</td>
<td>4</td>
</tr>
<tr>
<td>B</td>
<td>16</td>
<td>20</td>
<td>35</td>
</tr>
<tr>
<td>C</td>
<td>17</td>
<td>14</td>
<td>13</td>
</tr>
<tr>
<td>D</td>
<td>5</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>E</td>
<td>5</td>
<td>2</td>
<td>2</td>
</tr>
</tbody>
</table>

Given that in term one 67% of the students were studying their instrument of personal preference, it would be logical to expect dramatic shifts in results for the second term trial, where only 10% of students were studying their instrument of first choice. The results from the second term trial are surprisingly similar to the first. Only eight
students, or around 14% had a shift in results of two or more grades. In this small group of students there was no single determining factor that could be attributed to the results shifting either up or down. After the first trial it would have been logical to assume that instrument preference played an important role in terms of achieving successful results. After the second trial, this theory was conclusively proved to be incorrect. The number of students who achieved successful results in term 2 actually increased by 10%, from 54% to 64%.

In the third term trial, 14% of students were studying their preferred instruments. The resulting data was also very consistent with that of the second trial and the overall percentage of successful results (66%) was the highest of the three terms. Whilst the “A” results are somewhat lower in the third trial, the “B” results are dramatically higher which does balance out the successful results between all three of the trials. One explanation for these shifting results between “A” and “B” is the possibility that the instrumental teachers, either consciously or subconsciously, were expecting each student group to perform better as the trial progressed.

Students studying their instrument of first choice accounted for only 31% of the total “A/B” results. As seen in the profile example (Figure 5), even when the suitability grading of the student for a particular instrument was low, the effort rating was often still high. This was an aspect of the program that surprised and elicited positive comments from the instrumental music staff.

The second cohort of students undertook the same three-term trial program the following year: the results across this period are displayed in Table 35.
Table 35: Term Results—Cohort 2

<table>
<thead>
<tr>
<th>Result</th>
<th>Term 1</th>
<th>Term 2</th>
<th>Term 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>23</td>
<td>11</td>
<td>15</td>
</tr>
<tr>
<td>B</td>
<td>23</td>
<td>30</td>
<td>28</td>
</tr>
<tr>
<td>C</td>
<td>13</td>
<td>18</td>
<td>18</td>
</tr>
<tr>
<td>D</td>
<td>7</td>
<td>9</td>
<td>6</td>
</tr>
<tr>
<td>E</td>
<td>2</td>
<td>0</td>
<td>1</td>
</tr>
</tbody>
</table>

The second cohort displayed some very similar trends to that of the first. The percentage of students achieving successful results in each term was very comparable to the results from cohort one in the previous year. The only major difference between the results of the two cohorts was the absence of the sharp rise of successful results between terms one and two in the first cohort. In the second cohort the percentages of successful results were a little more consistent across the three terms: term 1–68%, term 2–60% and term 3–63%.

In a global sense, this meant that five out of the six trial terms across the two years of the program returned successful results of between 60% and 68%. These results are a strong justification for instrument immersion programs to be standard in the primary or middle years of schooling.
Will students succeed on an instrument that is neither their choice nor timbre preference?

Given the results discussed in the previous question it would be reasonable to assume that examination of this question will return a positive result. The importance of this question however, in relation to the testing methods is critical to the overall study. Perhaps more importantly, if students are just as likely to succeed on an instrument that is not their first choice or their timbre preference, then it brings into question the usefulness of these systems as methods of instrument selection.

There were 23 students in Cohort One and 18 students in Cohort Two who were identified as fitting this category. These numbers represent 23% of all the students. Even discounting the students who chose to study percussion at the end of the immersion program (as there is no timbre associated with percussion in the Gordon Test) there were still 31 students or 24% who decided to settle on an instrument that was neither their first choice or timbre preference.

Swapping preferences between two different woodwind instruments accounted for 14 of these changes. Nine students moved between woodwind and brass instruments. There were eight students who had originally nominated percussion as their first choice and who moved to woodwind or brass, and ten students where the reverse applied. Most importantly, there were 12 students whose final choice of a brass instrument (trumpet–7 and trombone–5) came about as a direct result of the immersion program. As these brass instruments were neither their first choices nor timbre preferences, without this program the students would not have otherwise been given an opportunity to attempt them.
The same can be said for other students on different instruments in this category, however, it is more noteworthy when the program has a positive effect on numbers with the less popular instruments. These 12 students accounted for 41% of the total number selecting brass instruments at the conclusion of the program. This fact alone is justification for an instrument immersion program if a balance of instrument numbers is to be achieved.

Are students likely to decide on an instrument that they did not initially choose?

As described in the previous chapter, students in this age group are unlikely to make logical or well-informed decisions. Primary school students are likely to select an instrument on looks or peer influence. When it comes to selecting an instrument we cannot expect, nor should we expect these students to be able to make this kind of decision unassisted.

What has become clear is that when it comes to selecting musical instruments, most students will make a logical decision when it is based on real or practical experiences. Once they were given the opportunities and experiences of trying several different instruments, almost all the students were able to make logical decisions. These decisions almost always were directly related to their individual practical aptitude on a particular instrument.

With 50% of students deciding on an instrument that was not initially their first choice and with almost 50% of this group discovering their instrument through the immersion program, it is safe to say that primary school students are just as likely to succeed on an
instrument that they did not initially choose to play. Possibly the most interesting fact is that 25% of students chose to play an instrument that was not on their list to begin with. This statistic was quite coincidental, as it came about as a result of timetabling constraints where students could not be given all three-instrument nominations. This fact further reinforces the findings in the previous chapter relating to student choice, and also emphasises the value of an instrument immersion program.

Examining the longer term success rates of an immersion program, the results of the student body were monitored for a further two years in order to address the following question:

What are the success rates for students in the following two years of the compulsory program once their instrument has been established?

It should be noted that the cohort numbers in this program dropped slightly after one and two years of instrumental study. In Queensland, the end of Year 6 or 7 is a fairly traditional time for families to decide on a change of school, as it is the beginning of secondary or high school. Table 36 shows the results for all remaining students in both cohorts across a further two years of study.
Table 36: Results after One and Two Years of Instrumental Study

<table>
<thead>
<tr>
<th>Result</th>
<th>Cohort 1 (48) After 1 Year</th>
<th>Cohort 1 (48) After 2 Years</th>
<th>Cohort 2 (63) After 1 Year</th>
<th>Cohort 2 (60) After 2 Years</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>18</td>
<td>15</td>
<td>14</td>
<td>13</td>
</tr>
<tr>
<td>B</td>
<td>20</td>
<td>22</td>
<td>28</td>
<td>29</td>
</tr>
<tr>
<td>C</td>
<td>9</td>
<td>9</td>
<td>16</td>
<td>15</td>
</tr>
<tr>
<td>D</td>
<td>1</td>
<td>2</td>
<td>5</td>
<td>3</td>
</tr>
<tr>
<td>E</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

In Cohort One, there were nine students whose results changed after one and two years of study. Movement from an A to a B result, which accounted for five of the changes. Two students moved upwards in the successful band, from a B to an A result. Perhaps more importantly, only two students displayed a downward result, one from B to C and one C to D result. In Cohort Two, only three students showed movement on results after a second full year of study: One from A to B, and the others upwards from D to C and C to B. There were no cases in either cohort where a student moved more than one grading either higher or lower.

After one year of study 79% of the remaining students in Cohort One were achieving successful results. This percentage only dropped slightly to 77% after the second year of study. The percentage of successful results in Cohort Two remained steady at 67% after one and two years of study. Just over half of each cohort also sat for AMEB examinations in their first full year of instrumental study, and almost all of these students, plus a few more, sat the next grade in their second year of study. These independent results were both impressive and encouraging, as most received an Honours or a Credit grading.
Was the resulting spread of instruments viable for a successful concert band program using this method?

With any method of instrument selection in a school setting, the objectives must be to find an instrument for each student on which they can be successful, whilst also being mindful of creating viable ensembles with a reasonable balance of instruments.

An instrument immersion program may well result in the most successful of any method to achieving these important objectives. In Table 37, the spread of students across the different instruments at the conclusion of the immersion program is determined.

**Table 37: Number of Students Selecting Each Instrument**

<table>
<thead>
<tr>
<th>Instruments</th>
<th>Cohort 1</th>
<th>Cohort 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flute</td>
<td>13 (18)</td>
<td>17 (16)</td>
</tr>
<tr>
<td>Clarinet</td>
<td>9 (8)</td>
<td>12 (7)</td>
</tr>
<tr>
<td>Saxophone</td>
<td>9 (14)</td>
<td>8 (12)</td>
</tr>
<tr>
<td>Trumpet</td>
<td>7 (4)</td>
<td>9 (5)</td>
</tr>
<tr>
<td>Trombone</td>
<td>7 (2)</td>
<td>6 (4)</td>
</tr>
<tr>
<td>Percussion</td>
<td>14 (13)</td>
<td>16 (23)</td>
</tr>
</tbody>
</table>

The numbers in brackets (table 37), represent the number of students who nominated each instrument as their first choice. It is obvious that without the immersion program the balance of instruments would have been quite different. Brass was the area that benefited most strongly from the program, and there was also a better balance achieved across the woodwind instruments.
What is the likely retention rate of students in an instrumental music program after the compulsory period has elapsed?

A total of 68 students across the two cohorts continued into the Year 8 elective instrumental music program. There were 28 students from Cohort One (58% of the remaining 48 students) continuing and 40 (63%) from Cohort Two.

To ascertain whether there were any determining factors in the continuing group of students the following questions were examined:

Were students on particular instruments more likely to continue?

Were students who achieved higher instrumental results more likely to continue?

In Cohort One, the spread of instruments across the 28 continuing students is displayed in Table 38.

Table 38: Instruments of Continuing Students - Cohort One

<table>
<thead>
<tr>
<th>Instrument</th>
<th>Number starting</th>
<th>Number continuing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flute</td>
<td>13</td>
<td>8 (62%)</td>
</tr>
<tr>
<td>Clarinet</td>
<td>9</td>
<td>5 (56%)</td>
</tr>
<tr>
<td>Saxophone</td>
<td>9</td>
<td>8 (89%)</td>
</tr>
<tr>
<td>Trumpet</td>
<td>7</td>
<td>1 (14%)</td>
</tr>
<tr>
<td>Trombone</td>
<td>7</td>
<td>2 (29%)</td>
</tr>
<tr>
<td>Percussion</td>
<td>14</td>
<td>4 (29%)</td>
</tr>
</tbody>
</table>

Although the total percentage (58%) of students continuing into the elective program was pleasing overall, the low percentages of students continuing on percussion and
brass instruments from Cohort One into Year 8 was quite concerning. Fortunately there are more year levels to draw from when forming a secondary school concert band.

The same statistics were then examined for Cohort Two and are shown in Table 39.

**Table 39: Instruments of Continuing Students - Cohort Two**

<table>
<thead>
<tr>
<th>Instrument</th>
<th>Number starting</th>
<th>Number continuing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flute</td>
<td>17</td>
<td>12 (71%)</td>
</tr>
<tr>
<td>Clarinet</td>
<td>12</td>
<td>9 (75%)</td>
</tr>
<tr>
<td>Saxophone</td>
<td>8</td>
<td>7 (88%)</td>
</tr>
<tr>
<td>Trumpet</td>
<td>9</td>
<td>5 (56%)</td>
</tr>
<tr>
<td>Trombone</td>
<td>6</td>
<td>3 (50%)</td>
</tr>
<tr>
<td>Percussion</td>
<td>16</td>
<td>4 (25%)</td>
</tr>
</tbody>
</table>

The overall percentage of continuing students from cohort two was higher at 63%, and with the exception of percussion, there was also a more consistent uptake across the instruments. Consistent with Cohort One, there were strong percentages of students continuing on all the woodwind instruments. Compared with Cohort One, students continuing on brass instruments showed a greater increase in the second cohort but the uptake on percussion was still very low. Given the “drop-out” rate was particularly high in percussion across both cohorts, it would indicate that having a higher percentage of students trial and then elect to study percussion in a compulsory program is strongly advisable. The same could be said for the brass instruments, which again did not show a high uptake. One solution to this problem might be to run an immersion program where studying a brass instrument is a compulsory element within the program. If time and resources were permitting, immersion programs of woodwind, brass and percussion could increase and maximise the benefits of this system.
The most common reasons given for discontinuing lessons were:

increased commitment to extra-curricular sporting activities

pressure (either parental or self-imposed) to achieve more academically in high school

not coping with increased homework load

Only two students said they were no longer interested in playing an instrument but there were no students who said they were not enjoying playing their instrument. Financial considerations did not apply here, as instruments and lessons at this school were offered at no additional cost to parents.

This study has already ascertained that students with high academic results, high musical aptitude, or both, are no more likely to continue playing their instrument than those who are average or below average in these areas. It is perhaps logical to assume that the students who continue to play their instrument on a voluntary basis are achieving high instrumental results.

The instrumental results of the 68 students across the two cohorts who continued to play in the elective program were as follows: A–21, B–28, C–17, D–1. Whilst the A and B results account for 72% of these students, there were still 25% who were happy to continue playing whilst achieving average results.
What was the student response to this program?

To measure the level of satisfaction and enjoyment the students gained from the program, they were asked to complete a survey in Term 4 of Year 7 (Figure 6). This task was administered during a classroom music lesson with the room assembled in an exam style format. Names were not required on the survey and communication between students was discouraged. There were 40 students in attendance from the first cohort who were eligible to complete the survey and 52 students from the second cohort the following year. A copy of the survey these students completed is shown in Figure 6.

In reporting on the data collected, the responses from the two cohorts have been separated for purposes of identifying any correlations and differences. It should also be noted that the students were not required to include their names on the survey. The intention here was to obtain the most honest responses possible, and to prevent the students from giving responses that they thought the staff would prefer to read.

Following are the recorded responses from Cohort One (40 students).

<table>
<thead>
<tr>
<th>I enjoyed taking part in the Year 5 band rotation program.</th>
<th>Very much</th>
<th>It was OK</th>
<th>Not at all</th>
</tr>
</thead>
<tbody>
<tr>
<td>21</td>
<td>18</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>I thought the opportunity to study three different instruments was…</th>
<th>Fun and exciting</th>
<th>Interesting</th>
<th>Not worthwhile</th>
</tr>
</thead>
<tbody>
<tr>
<td>21</td>
<td>17</td>
<td>2</td>
<td></td>
</tr>
</tbody>
</table>
The number of positive student responses concerning the above two statements is certainly encouraging, and should serve as justification for the continuation of such programs. It is a contemporary educational belief that children tend to learn better and retain more information when they are activity engaged in and enjoying their
participation in any program. In this instance, the positive survey responses correlate with the number of successful instrumental results. The middle-ground or non-committal responses would also indicate that students, who achieved only a satisfactory or C result, still enjoyed the program to some extent. Whilst it is encouraging to know that the majority of students found the program enjoyable or at least interesting, the responses to the following statements are of particular interest to this study.

<table>
<thead>
<tr>
<th>The teachers in the program encouraged me.</th>
<th>Very much</th>
<th>Mostly</th>
<th>Not at all</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>24</td>
<td>15</td>
<td>1</td>
</tr>
</tbody>
</table>

It is difficult to estimate, either as a number or percentage, the degree to which the staff contributed to the success of this program. Having said this, the importance of having a professional and enthusiastic staff to deliver instrumental programs in schools can never be overestimated. The significance of the teacher-student relationship to achieving success in instrumental music both individually and in programs as a whole, is certainly worthy of further investigation.

The following statement was important to include in the student survey to further validate the use of an instrument immersion program:

<table>
<thead>
<tr>
<th>At the end of Year 5, I still wanted to play my original first choice of instrument.</th>
<th>Yes</th>
<th>No</th>
<th>Can’t Remember</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>11</td>
<td>18</td>
<td>11</td>
</tr>
</tbody>
</table>

These responses support the statistical findings of the study in relation to the number of students who changed their initial first preference of instrument. The fact that almost
half the students completing the survey recognised that their choice of instrument had changed during the program further increases support for the instrument immersion program as an educationally worthwhile activity.

The following statements in the survey were focused on the students’ reasoning and decision making process.

<table>
<thead>
<tr>
<th>I chose the instrument that I could play the best.</th>
<th>Yes</th>
<th>No</th>
<th>I found it hard to tell</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>31</td>
<td>5</td>
<td>4</td>
</tr>
</tbody>
</table>

This response further reinforces the value of the immersion program and also indicates that given appropriate opportunities and a positive and encouraging environment, the majority of students will make an informed decision. The fact that the majority of the students elected to play the instrument on which they achieved most highly (which in most cases was different from their initial first choice), proved that they were capable of making sound decisions, based on the experiences gained throughout the program.

<table>
<thead>
<tr>
<th>My friends influenced my choice of instrument.</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>7</td>
<td>33</td>
</tr>
</tbody>
</table>

As this program gave the students the opportunity to explore several instruments and find which instrument they were best suited to, they were able to make an individual decision, and were far less likely to be influenced by peer pressure. As is evident from the above responses, only a relatively small number of students admitted to being influenced by their peers in regard to their final choice of instrument.
The following two statements relate to the home environment and the level of commitment devoted to the instrumental program outside of the school setting.

<table>
<thead>
<tr>
<th>I practised my instrument at home.</th>
<th>&gt; 5 times a week</th>
<th>3–5 times a week</th>
<th>1–2 times a week</th>
<th>Never</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>4</td>
<td>18</td>
<td>15</td>
<td>3</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>My parents/guardians encourage me to practice at home.</th>
<th>Frequently</th>
<th>Sometimes</th>
<th>Never</th>
<th>I’m not allowed to Practice at home</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>17</td>
<td>20</td>
<td>3</td>
<td>0</td>
</tr>
</tbody>
</table>

The subject of parental involvement in instrumental practice is an area worthy of further research. The question of whether to encourage, enforce, or even be actively involved in a child’s instrumental practice, is difficult to answer in a way that will suit every child or situation. As these surveys were completed anonymously, there was no way of accurately tying either the amount of practice per week, or the level of parental involvement, to the learning outcomes of the students. For the purposes of this study, it was more important to provide a forum where the students could answer the questions honestly without feeling any obligation or pressure in terms of how their responses might be received. It was, however, noted by the staff that students who had recorded regular amounts of practice in their school diary were more likely to be making steady progress and therefore be achieving the higher results.

The final statement was designed to encourage the students to consider a future commitment to their instrumental study.
<table>
<thead>
<tr>
<th>I think I will continue with my instrument next year.</th>
<th>Definitely</th>
<th>Maybe</th>
<th>Not Likely</th>
<th>I’m not allowed to play next year</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>27</td>
<td>5</td>
<td>7</td>
<td>1</td>
</tr>
</tbody>
</table>

This survey response would appear to be very honest and realistic as it accurately reflected the number of students who moved into the elective instrumental program for Year 8 in this cohort.

A small number of students chose to make their own comments in the additional space provided on the survey. These comments were sufficiently sincere and meaningful so they warrant inclusion here:

“\[I\] think it would be cool if you could try 4 instruments. 1 for each term.”

“I think it [the instrument immersion program] is definitely a good thing as I would not have known [which instrument to play] before taking part.”

“It is definitely a fun and enjoyable way of trying out the instruments.”

“Maybe do it again, there are some instruments I really want to try again and some that I didn’t try out. But I want to keep playing clarinet.”

Following are the same survey responses from Cohort Two (52 students):

<table>
<thead>
<tr>
<th>I enjoyed talking part in the Year 5 band rotation program.</th>
<th>Very much</th>
<th>It was OK</th>
<th>Not at all</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>42</td>
<td>9</td>
<td>1</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>I thought the opportunity to study three different instruments was…..</th>
<th>Fun and exciting</th>
<th>Interesting</th>
<th>Not worthwhile</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>38</td>
<td>13</td>
<td>1</td>
</tr>
</tbody>
</table>
The teachers in the program encouraged me.

<table>
<thead>
<tr>
<th></th>
<th>Very much</th>
<th>Mostly</th>
<th>Not at all</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>41</td>
<td>9</td>
<td>2</td>
</tr>
</tbody>
</table>

The responses here show a very similar trend to that of Cohort One. The only difference here is that the Cohort Two responses tend to lean towards the most positive end of the response choices, which means that there were less students opting for the more “middle-ground” response. Consistent with Cohort One, the negative responses were very minimal. The fact that the second cohort contained slightly higher achievers in terms of successful results, may also account for their greater percentage of positive responses and an apparent overall greater enjoyment of the program.

<table>
<thead>
<tr>
<th>At the end of Year 5, I still wanted to play my original first choice of instrument.</th>
<th>Yes</th>
<th>No</th>
<th>Can’t Remember</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>26</td>
<td>17</td>
<td>9</td>
</tr>
</tbody>
</table>

Although the yes and no responses in regard to original first choice of instrument are weighted differently between the two cohorts, it is still clear that a high percentage of students in cohort two did benefit from the immersion program in terms of finding a suitable instrument.

<table>
<thead>
<tr>
<th>I chose the instrument that I could play the best.</th>
<th>Yes</th>
<th>No</th>
<th>I found it hard to tell</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>47</td>
<td>1</td>
<td>4</td>
</tr>
</tbody>
</table>

As is evident from this response, the overwhelming majority of students in Cohort Two also made their final instrument choice in relation to their achievements. Consistent with the other answers from this cohort is the slightly higher percentage of affirmative responses.
My friends influenced my choice of instrument. | Yes | No |
--- | --- | ---
6 | 46 |

As with Cohort One, the response to this statement would indicate that most students felt comfortable making their own decision about instrument choice and that peer pressure was again only very minimal in this cohort.

| I practised my instrument at home. | > 5 times a week | 3–5 times a week | 1–2 times a week | Never |
--- | --- | --- | --- | ---
| 5 | 26 | 15 | 6 |

It has already been established that the amount of practice cannot be specifically attributed to individual students. However, it is clear that a higher number in this cohort fell into the first two categories of practice times per week. Although difficult to prove, it would suggest that the overall higher level of successful results from this cohort may be attributed to the greater amounts of home practice.

| My parents/guardians encourage me to practice at home. | Frequently | Sometimes | Never | I'm not allowed to Practice at home |
--- | --- | --- | --- | ---
| 21 | 26 | 5 | 0 |

Similarly, the amount of encouragement in the home environment increased slightly amongst the second cohort. This may also be a factor contributing to the overall higher levels of achievement evident in this cohort as a whole.
As with Cohort One, this section of the survey gave an accurate reflection of the student numbers continuing into the Year 8 elective instrumental program. The high rate of continuation further confirms that if students can achieve success on an instrument they are likely to proceed with their studies on a voluntary basis.

The additional comments from students in cohort two have been included below:

“I think it’s a good thing because I didn’t know what I wanted to play.”
“I liked all the instruments.”
“It helped me to choose an instrument.”

The student surveys proved to be a valuable tool for validating and drawing together much of the data gathered in the various sections of the study. In particular, the survey responses strongly supported or confirmed the research findings in relation to the instrument immersion program. Future surveys may include the option for students to include their name on the document for the purposes of further results based research.

**Summary and Conclusions**

As a method of instrument selection, the immersion program proved to be very effective and successful in terms of learning outcomes. Most students were enthusiastic and engaged, and the staff found the program to be very worthwhile in terms of recruiting students. A very high degree of successful results for all three rotations of instruments dispelled any initial concerns relating to student effort.
The fact that students were exposed to a greater variety of instruments proved to be very valuable in terms of their ultimate instrument selections. Students were also more likely to trial an instrument that they would not normally have considered or that was perceived as having a particular gender association. Most importantly, students were more likely to find an instrument on which they could achieve success. Although an immersion program is a lengthy process compared with other methods of instrument selection, and is also demanding on resources, the benefits are multi-faceted. The program facilitates:

- maximum exposure to instruments
- probable high levels of participation and enthusiasm from student body
- increased chances of successful results
- balanced numbers recruited to each instrument
- strong retention rates

In short, an instrument immersion program allows for maximum exposure and participation whilst optimising the chances of the participants finding a suitable instrument on which they can achieve success.
Chapter 7: Other Factors Affecting Instrument Selection

The impact of Gender, Physiology and Personality on instrument selection and learning outcomes.
The Role of Gender, Physiology and Personality in Instrument Selection

Whilst gender, physiology and personality are not classified as methods of instrument selection, it would be naïve to suggest that these elements do not play some part in the instrument choices of students. As already mentioned in Chapter Three, gender association with musical instruments has been well documented. Some instrumental teachers look for specific physical traits such as large hands, long arms, or a certain mouth shape, when placing students on instruments. Whilst there is much anecdotal evidence, particularly amongst musicians, on personality and instrument choices, the area of research which attempts to correlate personality types with players of specific instruments has been largely inconclusive.

The impact of gender in relation to instrument selection

The author’s experience in teaching instrumental music reveals that most music educators make a conscious effort to break down the gender stereotyping associated with instrument selection amongst school students. Despite these ongoing efforts, the phenomenon of gender association with musical instruments is still widespread in schools today. This is validated through frequent interactions with colleagues in a variety of educational settings. It is very common for music teachers, particularly in single sex schools to find their concert band programs lacking in certain instrument families. Specifically this affects lower brass in girls’ schools, and instruments such as flute in boys’ schools. In co-educational schools and colleges these same instrument groups are usually dominated by a single sex. This study also revealed a prevalence of gender association in relation to instrument selection. These gender associations showed strong similarities to Harrison’s findings from his extensive research in this area:
Instrument choice, including singing, is the area in which the most obvious (gender) differences occur. Boys typically shy away from softer, smaller instruments. Girls generally don’t take larger, louder instruments, as indicated below. There are, of course, exceptions. The reasons for this are not entirely clear. They may be associated with the functions of representation and identity. Boys will not take on activities that are perceived to be feminine. Girls, on the other hand, will gladly take on activities associated with boys. Put this one down to a win for feminism! (Harrison, 2005)

The gender stereotypes associated with particular instruments can be very influential to both primary and secondary students when it comes to selecting an instrument. As seen in Chapter 4, when students are completely left to their own devices to choose an instrument there are strong gender associations evident. Table 40 shows the instrument choices across the two cohorts separated by gender.

Table 40: Total Number of Boys and Girls Choosing Each Instrument (127 students)

<table>
<thead>
<tr>
<th>Instrument</th>
<th>Boys</th>
<th>Girls</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flute</td>
<td>4</td>
<td>29</td>
</tr>
<tr>
<td>Clarinet</td>
<td>6</td>
<td>8</td>
</tr>
<tr>
<td>Saxophone</td>
<td>11</td>
<td>15</td>
</tr>
<tr>
<td>Trumpet</td>
<td>6</td>
<td>2</td>
</tr>
<tr>
<td>Trombone</td>
<td>6</td>
<td>1</td>
</tr>
<tr>
<td>Percussion</td>
<td>33</td>
<td>2</td>
</tr>
<tr>
<td>No Preference</td>
<td>2</td>
<td>2</td>
</tr>
</tbody>
</table>

The instrument choices displayed in this table are clearly consistent with current research. At the extremes of the scale, flute is predominately a female choice, whilst percussion is clearly preferred by boys. Clarinet and saxophone are more equal, while brass leans to the male dominant side of the scale. Harrison’s instrument continuum (Figure 7), is supportive of these findings:
Throughout the course of this study, there were some strong opinions expressed by parents, more so than by the students, when it came to instrument choices. On a number of occasions there were parents who did not want their boys to play flute, and others not wanting their daughters to play trombone or percussion. Their reasons for this were quite openly because of their child’s gender. One example that serves to illustrate this point was a letter received by the author from the mother of a young female student who had been given a trombone as part of the trial rotation program. This student made a strong sound straight away, liked the sound, and was keen to take the instrument home and practise it. At home, her mother had impressed on her that the trombone was “a boy’s instrument”. In the letter she stated that it was “upsetting” that her daughter had been given a boy’s instrument and requested that it be swapped to something more suitable for a girl, such as the flute.

Whilst this seems like a rather antiquated attitude, evidence suggests that it is neither isolated nor uncommon. It serves to illustrate that musical instrument selection and gender stereotyping is still prevalent in schools and the wider community. Cutietta (2001), Crozier (2007) and Harrison (2005) suggest a shift in the attitude of girls towards playing instruments that have a traditional male domination. Whilst this is true, this study suggests that there is still considerable work to be done, particularly in the area of parent education, in breaking down gender stereotyping in relation to instrument selection.
Gender issues further compound these stereotypes. In this area girls are more fortunate than boys. Today a girl can choose any instrument she wants. But look at the flute section of the school band and see how many boys you find. Basically, the flute section and, to some extent, the clarinet section are off limits to boys. In days past, the trumpet and percussion section were off limits to girls, but those days are gone. (Cutietta, 2001)

Boys in particular are drawn to the drum kit, although there is a growing interest from girls. (Crozier, 2007)

**Instrument Timbre and Gender**

Chapter Three of this study explored timbre preference as a method of instrument selection, and found that liking a particular timbre was not necessarily a reliable indicator of achieving success on a particular instrument. It also revealed that a substantial number of students would not demonstrate a timbre preference. At this point it is worth revisiting the timbre preferences of the students in relation to gender.

Table 41 summarises the instrument timbre preferences in relation to gender of the combined cohorts:

<table>
<thead>
<tr>
<th>Instrument Timbre</th>
<th>Boys</th>
<th>Girls</th>
</tr>
</thead>
<tbody>
<tr>
<td>A—Flute</td>
<td>3</td>
<td>26</td>
</tr>
<tr>
<td>B—Clarinet</td>
<td>6</td>
<td>9</td>
</tr>
<tr>
<td>C—Saxophone</td>
<td>5</td>
<td>9</td>
</tr>
<tr>
<td>D—Double Reeds</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>E—Trumpet</td>
<td>12</td>
<td>2</td>
</tr>
<tr>
<td>F—Trombone</td>
<td>11</td>
<td>1</td>
</tr>
<tr>
<td>G—Tuba</td>
<td>11</td>
<td>1</td>
</tr>
</tbody>
</table>

Similar findings arose from an American study of 261 grade 4 students (Delzell and Leppla 1992), which had the purpose of investigating the effects of timbre on gender-
instrument association. That study did not employ the Gordon Test, rather, the students were asked to listen to recordings of typical elementary compositions found in beginner tutor books. They were played two different performances on seven different instruments. Rather than indicating which sound they preferred, the students were asked to indicate which gender they believed would select each instrument. The names or pictures of the instruments were never mentioned or shown. Results of this study indicated that gender-timbre associations were strong in this age group. Males were associated with brass instruments and lower strings whilst females were associated with flute and violin. Consistent with this study, and others already mentioned, no clear gender-timbre association was found with the clarinet or saxophone. Kelly’s findings are also consistent with this study:

It appears that despite a lack of any formal music ensemble experience, young students, based on timbre alone may still observe many musical instruments along traditional gender roles and attitudes. (Kelly, 1997)

In the second cohort of students in this study, seven of the students who chose the flute as a first preference after the instrument immersion program were boys. The surprising part was not the change from the initial first choice of instrument, considering only around 30% of all the students did stay with their first choice; it was the fact that these boys chose the flute. If the issue of gender is removed, and choice of instrument is examined within the context of this study, then this outcome is not as surprising as it seems. Considering the overwhelming majority of the students ultimately chose the instrument with which they were most successful, the fact that seven boys chose the flute should not really be surprising. Given the opportunity to trial the instrument for one term, as part of a three instrument trial program, it is reasonable to suggest that these boys chose to play the flute because of the self-discovery that this was the instrument to which they were most suited.
In this sense it could be said that this study contradicts some of the gender findings of previous studies; however, the context of this study is vastly different. This study has proven that if students, regardless of gender, are given the opportunity to trial a variety of instruments, music educators may well see a shift in traditional gender associations in regard to instrument selection.

**Physiology and Instrument Selection**

Many authors who discuss the topic of physical attributes in relation to musical instrument choice, place a high importance on a child’s physical suitability to particular instruments. Haroutounian emphasises fine motor skills and the ability to multi-task as necessary attributes:

> If children begin an instrument before they are physically able to play it, the experience is frustrating. No one wants a negative start to music lessons. Small muscle coordination requires independence of the fingers and the ability to do several things at once. (Haroutounian, 2002)

Both Crease and Crozier refer to physical size and age when considering instrument choice:

> Age and size are important factors, so be judicious about choosing an age-appropriate instrument for your child to start on. Your child should be able to hold or reach the instrument comfortably, without straining. (Crease, 2006)
> It is vital that the child can hold or manipulate the instrument comfortably. (Crozier 2007)

Cutietta discusses possible longer term effects of beginning to play an instrument before being physically ready:

> What happens if children try to play an instrument to which they are not physically matched? They can give up in frustration or, worse, become convinced that they cannot play music … (Cutietta, 2001)

Jorgensen’s view on instrument readiness is expressed in more comprehensive and holistic terms:
Their physical attributes as music makers and takers-their fingers, hands, posture, physical agility, breathing capacity, physiognomy, and coordination of mind and body - are as important as their psychological aptitudes and mental abilities. (Jorgensen, 2008)

As this study was dealing with Year 5 students (approximately 10–11 year olds) and the range of band instruments on offer were neither physically prohibitive nor exclusive, the physical size of the students was more of a peripheral issue, rather than a major concern. Within a small percentage of students there were some minor concerns raised with physical issues relating to the clarinet and trombone. Two concerns that arose with clarinet was finger length, and more often finger width required for covering the tone holes on the lower key joint. Arm length was the main concern that arose with the trombone; however, in the beginning stages the extended playing positions are not required.

When a student wished to trial a particular instrument and concerns arose relating to their physical compatibility, the instrument trial was delayed until the third trial period (Term 3), which in most cases allowed for enough extra growth for the instrument to be manageable. It should be noted that minor physical obstacles were of little concern to the students themselves and in many cases were easily overcome, if the desire to try a particular instrument was strong. With this in mind and considering the age group of the students, perceived physical compatibility should be placed comparatively low on the agenda in regard to instrument selection. Furthermore, it would be unwise to discourage a keen student from trying a particular instrument on purely physical grounds.

Physical issues found to be more important than actual size was the ability to form a successful playing embouchure, and therefore produce a desirable sound on a particular instrument. It was this factor of sound production on the woodwind and brass instruments that almost always determined whether a student pursued a particular
instrument. A single day trial method that assesses aptitude and physical compatibility to particular instruments, by having the students spend a few minutes on each might capture the “naturals” but is sure to miss potentially suitable students.

Available advice relating to physical suitability and instrument choice varies from being relatively generalised to more instrument-specific. Turner and Cutietta provide broad-spectrum information and advice relating to instrument families whereas Tovim-Boyd, Crease and Crozier examine each instrument in more detail. While the instrument specific advice in the following examples can certainly be regarded as helpful, this study finds that it is equally important to be aware that the physical requirements of each instrument can be developed over time. It is therefore suggested that information relating to physical suitability be used as recommendations or guides rather than be regarded as essential prerequisites.

The suggestions that Crease offers regarding the flute and clarinet are consistent with the observations of this study. The two main areas of difficulty that students encountered with the flute in this study was maintaining the correct playing position and sound production. It may prove worthwhile in future studies relating to instrument selection, and in particular the flute to develop a specific sound production test:

If your child can blow across the top of a bottle and get a sound, that’s the idea…Children are physically able to play the flute when they can stand upright with a straight neck and hold the flute horizontally…because the player cannot see his fingers while playing, a student needs good coordination … (Crease, 2006)

Crease makes specific reference to the more complex fingering system of the clarinet. As the trial periods in the immersion program were for a single term, the students who selected the clarinet only learned notes in the low (chalumeau) register of the instrument. It was however evident in the program amongst those students who later
chose to study the clarinet that problems can arise with the fingering system when changing registers on the instrument. Unlike the saxophone or flute, the three registers of the clarinet have quite different fingering, which can be a cause of initial frustration for some students. Students with particularly small hands or very slender fingers did also experience some difficulties with covering the finger holes.

Clarinets have their own fingering system and require coordination from both hands … when fingers can easily span the keys and cover the finger pads securely. (Crease, 2006)

In these examples from the literature, Ben-Tovim and Boyd and Crease suggest physical strength and stamina is required for brass instruments. The findings of this study would indicate that his use of the words aggressive and dominant is perhaps a little exaggerated in terms of suitability to these instruments:

The trumpet is a powerful, aggressive instrument for outgoing, dominant and physically strong children, mainly boys. (Ben-Tovim and Boyd, 1985)

The instrument (trumpet) requires strength and lung power. It is loud and noticeable … Unlike the woodwinds dual-finger coordination is not required to produce noises of different pitches. All brass instruments produce a big sound, and the stamina and exertion needed for sound production can provide a great release for very active children. (Crease, 2006)

Crozier’s suggestion that physical strength is required to play the drum kit could be seen as limited or restricted. During the course of this study there were several children of a physically small build who proved to be proficient drum-kit and mallet percussion players.

Playing the kit is a very physical activity. It requires a combination of physical strength and stamina as well as coordination and a sense of rhythm. (Crozier, 2007)

During the course of this study, it was not uncommon for students to take several weeks to form a playing embouchure, and produce the required tonguing techniques on the woodwind and brass instruments. All the teachers admitted that students, whom they initially thought might struggle, or be unsuitable, would suddenly surprise them by
having developed or mastered these fundamental playing techniques. One school term proved to be a suitable amount of time for the teachers and students to discover their levels of suitability to particular instruments. Students who were unable to master the basic embouchure requirements of the instruments were very unlikely to pursue these instruments as a final choice.

The findings of this study would suggest that literature relating to physical qualities and instrument compatibility should only be used as a general guide, as the physical requirements and demands of an instrument can often be learned and developed over time.

**Personality, Temperament and Instrument Selection**

Jung’s pioneering work on personality types in the 1920s was the basis for many of his successors and paved the way for what we commonly refer to today as a recognised four-personality type model, the Myers-Briggs. This test has seen popularity amongst employers in a variety of settings, including education, for the purpose of assessing the personality types of current and future employees. Up until 2006 this test was in use at the school where this research has taken place.

This style of personality-type testing takes the form of a self-report questionnaire where individuals are asked to respond to a series of yes/no, multiple choice, and word association questions. A large Australian engineering company confirmed in 2010, the use of the Myers-Briggs as part of their recruitment process for positions ranging from factory floor workers to leadership and managerial roles.
Adding to the complexity of personality debates is the argument of what constitutes a personality. Allport (1960) considered that one’s personality should encompass intellectual capacity, special abilities, temperament, and unconscious drives as well as pathological characteristics. Guilford (1959) expressed the idea that personality should embrace not only intelligence but also peoples’ interests and values. Cattell’s work in the early 1970s took a more focused view of personality. He essentially believed that personality was non-cognitive and whilst he included an intelligence scale in his work he explored the idea of personality, abilities and motivation as three quite separate areas or as he referred to them, ‘modalities’.

Formal personality testing has not been employed in this study and the author is not aware of any system that employs personality testing as a method of instrument selection. Cattell developed a test for school-age students—the High School Personality Questionnaire (HSPQ; Cattell and Cattell 1969); however, it was not felt appropriate for this study which deals only with primary school students. Given that standard personality tests are designed for adults, it was not regarded as necessary or appropriate to use any formal method of personality analysis on these students. However, as there is a considerable body of literature on the subject of personality in relation to instrument choice and musicians in general, it is nonetheless an interesting topic to briefly explore in relation to this study.

Two broad questions that were examined in regard to personality were:

Are different personality types attracted to particular instruments?

Does personality type contribute to success on an instrument?
While there is no literature that the author is aware of at the time of writing that specifically states certain personality types are a prerequisite for playing a particular instrument, books designed to assist parents in appropriate instrument selection for their children do contain information relating to personality. The way this type of information is presented varies between authors. Some suggest matching loud instruments with lively, boisterous children and quiet instruments with shy personality types. Others suggest an approach where a shy child, given a noisy instrument, might become more confident or outgoing:

When an instrument stands out as appropriate for your child’s age, musical likes and personality, jot it down on a piece of paper. You will find that some instruments suit more than one personality or learning style … Research evidence reveals that individuals with certain temperaments are more likely to be suited to particular instruments (Crozier, 2007)

Music can be used to help tense children relax, to vent emotions, and to satisfy a desire for creative expression. (Whitmore, 1980)

Some personality traits appear to be related to different levels of performing success in music and certainly this appears to be the case with regards to introversion. (Kemp, 1996)

How does your child’s personality match up with different instrumental voices? If she is an expressive person, sensitive and soulful, your child might enjoy playing piano, cello, clarinet, saxophone…If she has a milder nature and is drawn to gentler sounds, she might enjoy instruments with a light, introspective, or calm quality such as flute, guitar, harp, viola, French horn, or oboe. A humorous, energetic child might enjoy brass or woodwind family instruments…The highly kinesthetic child might enjoy drums or percussion. (Turner, 2004)

Anecdotal evidence suggests that if you have a boisterous, noisy child and are hoping that a spell of learning an instrument associated with peaceful musical performance will help calm him or her it is unlikely to pay dividends. (Crozier, 2007)

Cutietta adopts a more careful approach or viewpoint in regard to personality type and instrument selection but does seem somewhat undecided on the importance of the issue:

A large body of research also shows that a child’s personality type, when measured in terms of such factors as introvert and extrovert, does not help or hinder the learning of certain instruments. (Cutietta, 2001)
There are few sure or easy rules regarding choosing instruments. The one unchanging rule is that instruments have personalities. Thus, not every instrument is for every child. (Cutietta, 2001)

In relation to individual instruments, Crozier, Crease and Tovim-Boyd all single out brass, in particular the trumpet, and also percussion when discussing personality type. Whilst their information and advice relating to playing woodwind instruments is more gender and physiologically oriented, they do however make suggestions with regard to personality, when discussing brass and percussion as instrument choices.

Brass players often stick together. They tend to have a ‘can do’ attitude to playing… When you play a note on the trumpet everyone in the ensemble knows about it, so children starting the instrument need a degree of self-confidence. (Crozier, 2007)

Not an instrument for delicate or sensitive children. (Ben-Tovim and Boyd, 1985)

The trumpet is a flashy, extroverted instrument… It is a good instrument for extroverts, but also for shy children who are daring and may need a new way to stand out. The trumpet requires a lot of patience and hard work to make real headway. (Crease, 2006)

Drums and percussion can be a great choice for active and even fidgety children. (Crease, 2006)

All percussion players require a clear conviction of purpose that enables them to come in on the right note at the right time. (Crozier, 2007)

Kemp is more questioning of the validity of attempting to correlate personality types and musical instruments:

A kind of folklore exists within musical circles, particularly orchestras, involving beliefs, often quite seriously held, that fundamental personality differences exist between the players of different instruments …
It must have been considerably disappointing to the early researchers, who sought to establish links between personality and musicianship by calculating intercorrelations between music and personality tests, to end up with largely inconclusive results. (Kemp, 1996)

It is difficult to assess whether a personality type contributes to achieving success on a particular instrument, or whether one personality type might have more musical ability than another. It is also difficult to assess whether an instrument can have any effect on personality development itself. If it is valid to suggest that a shy, cautious student might become more outgoing and confident if given an instrument such as the trumpet, then alternatively it is just as feasible to suggest that their personality might prevent them from considering such an instrument in the first place. The question of whether a student’s personality and temperament can be used as a predictor of musical success or if their ability be developed as a result of musical instruction is also an area of interest for Kemp:

Do people become musicians because they have the appropriate temperament, or does the process of developing the requisite skills also stimulate personality development? … temperament can be viewed as conducive to musical development or, alternatively, consequential to it. Certainly one suspects that by adding personality data to data on ability we will considerably enhance the power of the latter to predict the future development of the musical talent. (Kemp, 1996)

The writer developed a familiarity with the character, temperament and behaviour of the students in this study over a four-year period. To ascertain whether any noticeable trends were evident in different behavioural groups in regard to instrument selection and achievement the students were divided into three broad personality categories:

- Quiet, shy or reserved (31 students or 24%)—these were students who worked quite independently and diligently. They were typically well organised with equipment, and with recording their practice.
• Confident and outgoing (29 students or 23%)—these students were typically enquiring and noticeably enthusiastic—they would often seek out teachers between lessons to ask questions or report on their progress.

• Neither shy nor outgoing (67 students or 53%)—although this larger group of students were not exactly the same, they did not fit the above two categories and were therefore grouped together.

When looking at the instrument choices of the three groups, the following questions were examined:

• Were students in the shy or outgoing categories attracted to specific instruments?

• Were students in any of these categories more or less likely to change their instrument preference after the immersion program?

• Was there a personality type that achieved more successful results on their instruments?

• Was there a personality type that was more likely to continue learning after the compulsory period?

Tables 42, 43 and 44 show the instrument choices of the combined cohorts separated into the three identified personality groups:
Table 42: Instrument Choices of Students in Category 1 (shy/reserved—31)

<table>
<thead>
<tr>
<th>Instruments</th>
<th>First Preference</th>
<th>Preference after Immersion Program</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flute</td>
<td>9 (29%)</td>
<td>8 (26%)</td>
</tr>
<tr>
<td>Clarinet</td>
<td>5 (16%)</td>
<td>4 (13%)</td>
</tr>
<tr>
<td>Saxophone</td>
<td>8 (26%)</td>
<td>9 (29%)</td>
</tr>
<tr>
<td>Trumpet</td>
<td>2 (6%)</td>
<td>3 (10%)</td>
</tr>
<tr>
<td>Trombone</td>
<td>2 (6%)</td>
<td>1 (3%)</td>
</tr>
<tr>
<td>Percussion</td>
<td>5 (16%)</td>
<td>6 (19%)</td>
</tr>
</tbody>
</table>

The instrument choices of this group did not show the students gravitating in high numbers to any particular instrument. Although flute was marginally the most popular instrument as an initial first choice, the saxophone was a very close second. This would indicate that personality did not play a major role in the instrument choices within this group.

Table 43: Instrument Choices of Students in Category 2 (outgoing/confident—29)

<table>
<thead>
<tr>
<th>Instruments</th>
<th>First Preference</th>
<th>Preference after Immersion Program</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flute</td>
<td>8 (28%)</td>
<td>8 (28%)</td>
</tr>
<tr>
<td>Clarinet</td>
<td>3 (10%)</td>
<td>9 (31%)</td>
</tr>
<tr>
<td>Saxophone</td>
<td>7 (24%)</td>
<td>4 (14%)</td>
</tr>
<tr>
<td>Trumpet</td>
<td>1 (4%)</td>
<td>4 (14%)</td>
</tr>
<tr>
<td>Trombone</td>
<td>1 (3%)</td>
<td>2 (7%)</td>
</tr>
<tr>
<td>Percussion</td>
<td>9 (31%)</td>
<td>2 (7%)</td>
</tr>
</tbody>
</table>
Although percussion was the most popular initial first choice in this group, this was very closely followed by flute and then saxophone. Of more interest in this group is the shift in preferences after the immersion program which saw a substantial swing away from percussion and saxophone towards clarinet and brass. This swing may reflect a confident attitude and the ability of these students to accept or recognise where their abilities are strongest.

**Table 44: Instrument Choices of Remaining Students (67)**

<table>
<thead>
<tr>
<th>Instrument</th>
<th>First Preference</th>
<th>Preference after Immersion Program</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flute</td>
<td>16</td>
<td>14</td>
</tr>
<tr>
<td>Clarinet</td>
<td>8</td>
<td>8</td>
</tr>
<tr>
<td>Saxophone</td>
<td>11</td>
<td>4</td>
</tr>
<tr>
<td>Trumpet</td>
<td>6</td>
<td>10</td>
</tr>
<tr>
<td>Trombone</td>
<td>4</td>
<td>9</td>
</tr>
<tr>
<td>Percussion</td>
<td>22</td>
<td>22</td>
</tr>
</tbody>
</table>

The remaining group of students showed a similar initial interest in percussion, flute and saxophone. The most interesting movement in this group after the immersion program was a shift away from saxophone towards the brass instruments.

On examination of the second question—were students in any of these categories more or less likely to change their instrument preference after the immersion program?—the highest percentage of students who changed instrument preferences came from the confident and outgoing group at 54%. However, this percentage was almost the same as the category three students, where 53% of the 68 students also elected to change instruments. Only 42% of the 31 quiet, more reserved students changed their instrument
preferences. There could of course be many reasons for this: perhaps students in this personality group were more inclined to make careful, or measured decisions to begin with. Another equally valid viewpoint suggests that this personality type is less likely to embrace change, and simply settle with an initial decision.

If personality type is ever to be considered or included as a method of selecting students for instrumental music programs or for assisting with instrument selection in schools, gathering substantial and reliable data on the success rates of differing personality types will be vital.

The nature of the data in this study allows for some preliminary examination of achievement comparison in relation to the personality types identified. It must be stressed that the students were personality grouped on the basis of the relationship developed with the writer over a four-year period and these groupings were not the product of any formal psychological or recognised personality type testing.

The following table displays the results achieved by the three identified groups of students after one full year of study on their chosen instrument.

<table>
<thead>
<tr>
<th>Personality Group</th>
<th>% A Results</th>
<th>% B Results</th>
<th>% C Results</th>
<th>% D Results</th>
<th>% E Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quiet students 31</td>
<td>32%</td>
<td>42%</td>
<td>19%</td>
<td>6%</td>
<td>0%</td>
</tr>
<tr>
<td>Outgoing students 29</td>
<td>52%</td>
<td>31%</td>
<td>10%</td>
<td>6%</td>
<td>0%</td>
</tr>
<tr>
<td>Remaining students 67</td>
<td>12%</td>
<td>51%</td>
<td>28%</td>
<td>9%</td>
<td>0%</td>
</tr>
</tbody>
</table>
The first result column shows that the outgoing, more confident students, who were also the smallest in number, were clearly conspicuous as the high achievers. When looking at the total successful results (A and B) this was also the standout group with 83% of students achieving a successful result. The quiet or shy students also achieved an impressive overall success rate of 74%. Whilst the remaining students had a very low percentage in the A result category, their overall percentage of successful results totalled 63%.

Due to the small amount of existing research and knowledge in this area, reasons for these outcomes can only be speculative at this time. However, the marked difference in results between these basic identified groups of students is too great to be ignored, or disregarded as coincidence.

Perhaps the outgoing, confident students achieved such a high success rate because they unreservedly launched into practising their instrument with enthusiasm and verve. The shy students, who also achieved a high rate of success, perhaps took a measured, careful and diligent approach to their studies. The larger group of students who did not fall into either category were perhaps at this stage of their development yet to find an area of specific interest and were therefore less inclined or not accustomed to applying themselves to an exacting or precise task.

Examining the longer term with regard to which group of students were more likely to continue playing their instruments after the compulsory period, and remain in the elective program was also important. The resulting data relating to this question
strongly supports and coincides with the achievement statistics. The percentages of continuing students in the three identified personality groups were as follows:

Confident and outgoing students—79%

Quiet and reserved students—65%

Remaining students not in the above two categories—34%

The questions raised in this chapter concerning personality in relation to instrument choice and achievement outcomes may never be comprehensively or scientifically answered. They are nonetheless interesting to contemplate. Given the findings of this study it is reasonable to suggest that there is much scope for further research in this area and in developing a practical and reliable way of identifying and measuring the causes and effects of personality types on instrumental achievements.
Chapter 8: Conclusions and Recommendations

Best practice in instrument selection in terms of successful outcomes
An overview of the methods as reliable predictors of successful outcomes

The five methods of instrument selection examined in this study have all proved useful to some degree in predicting successful instrumental learning outcomes. The consistency and reliability of each method as an accurate predictor, does however vary considerably between each method. Furthermore, this study has concluded that the most commonly or frequently used methods are not always the most reliable, and consequently recommendations will be made according to these findings.

Study A- Academic Ability

Using pre-existing high academic results as selection criteria for placing students in instrumental music programs will usually equate to a high success rate in an instrumental music program. In this context, academic ability is indeed a reliable indicator of whether or not a student will succeed on an instrument. Due to the nature of this study, where all students were studying an instrument regardless of their academic ability, it has become quite clear that using this method will definitely not catch all the students who would achieve highly.

Average or below average academic results did not in most cases lead to poor performances on musical instruments. In fact, average academic achievers were just as likely as high academic achievers to be successful on an instrument. Furthermore, some low academic achievers scored high instrumental results and similarly a small percentage of high academic achievers scored low instrumental results. It should be stressed that while this method is an accurate predictor of success, as a method of
selecting suitable candidates to participate in an instrumental program, it has proved to be unnecessarily exclusive.

The finding that no students’ academic achievement results fell whilst devoting time to the study of an instrument, is a highly important outcome which may help to change prevailing attitudes in some parents and teachers as discussed in Chapter 2. The fact that the overall academic levels of both cohorts increased over a three-year period, may not be wholly attributable to the study of a musical instrument, but is certainly a strong coincidence.

**Study B- Rhythmic and Pitch Skills**

This research has also shown that a large percentage of students who score well in musical aptitude testing will produce successful results on a musical instrument. However, as with high academic achievement, strong musical aptitude test results does not necessarily equate to successful outcomes in instrumental music.

If access to instrumental music programs is only available to students who perform well in these tests, this study has shown that a great deal of potential will be lost. If this potential is to be realised, then programs where every child is given the opportunity to study instrumental music are a necessity. An ideal method of achieving equity in the study of instrumental music would involve the implementation of instrumental music as a core-curriculum subject in one or more year levels of primary or middle schooling. A compromise would see a situation where instrumental music is at least offered to all students. This study strongly indicates that both these suggestions would have long-term benefits for individuals and music programs in general.
Study C- Timbre Preference

As stated in Chapter 4, the Gordon Test was included in this study due to its extensive use throughout primary schools in Australia. The data gathered from the implementation of the Gordon Test indicates that using timbre preference testing as a method of predicting successful instrumental outcomes is limited. The Gordon Test will provide instrumental teachers with a large amount of interesting data that is best used as a general guide or indicator of the individual student’s current taste in instrument timbre. Scores at the extremes of the timbre preference scale, (0,1 and 11,12) indicating a strong like or dislike for a particular timbre were somewhat accurate as result predictors, however this was only applicable to a very small percentage of students.

The most common problem that arose with placing students on instruments based on timbre preference was the fact that most students were not able to successfully reproduce the desired timbre in a reasonable amount of time. In most cases, students who were unable to produce the desired sound on a particular instrument, usually because they were unable to form a successful embouchure, became discouraged within the first few weeks of lessons even if the instrument was their highest timbre preference. In much the same way as aural and rhythmic skills testing is an indicator of musical aptitude, the Gordon Test can reliably determine timbre preference in most instances. As a predictor of success for instrumental music, the data gathered using timbre preference testing is best used as a mechanism to strengthen or support other data gathered from a range of different testing methods. In this way an instrumental profile can be compiled for the individual with timbre preference as one component.
As the Gordon Test was developed almost thirty years ago, and the sounds that the students hear during the testing are produced on a primitive synthesizer, it is perhaps timely to suggest that a more current timbre preference testing method be developed. This is certainly an area worthy of further investigation and development.

**Study D- Student Choice**

Giving students complete freedom of choice on instrument selection proved to be the most inadvisable method examined in this study. This was the case for two reasons: firstly this method is likely to produce vast unevenness in the number of students studying each instrument, making a band program difficult to balance, but more importantly, the dropout rate in an instrumental program is likely to be alarmingly high.

Even though only a small percentage of students continued studying the instrument they initially selected, the process of letting the students have first preference on the instrument of choice as part of a wider selection process was certainly worthwhile. This process was a valuable learning experience for both the students and the teachers involved in the study. The students learned that decision making in relation to instrumental study needed to be based on far more than simply a desire to play a particular instrument. Some students freely admitted that their initial choice of instrument arose from peer or parental pressure. The instrumental staff found that giving students a trial period on their first choice of instrument meant that they were more willing to participate, more accepting of change, and more confident with their final decisions.
An own choice method of instrument selection should only be considered if the facility and resources exist within a school to allow students an initial trial period on their first choice of instrument and the flexibility to change if need be. Where this option is not viable, and given that schools depend on student numbers in beginner band programs to feed into their more advanced ensembles, using a method that provides far more assistance and guidance for instrument selection is strongly advisable.

**Study E- Instrument Immersion- Rotational Program**

The instrument immersion rotation program proved to be the most effective and successful method in terms of learning outcomes. Contributing to the success of this program was the high level of enthusiasm and engagement it was able to generate amongst the students and staff. It was also a very useful tool in terms of recruiting students and balancing instrument numbers. The very high degree of successful results achieved across the three rotation periods dispelled any initial concerns relating to student effort, and the overall time commitment needed to run the program.

Students were exposed to a greater variety of instruments and were also more likely to trial an instrument that they would not normally have considered, or which was perceived as having a particular gender association. Most importantly, using this method meant that the highest possible percentage of students found an instrument on which they could achieve success. Although an instrument immersion program is a lengthy and involved process compared with other methods of instrument selection, this study highly recommends its use for returning both short and long-term successful learning outcomes.
Assessment of Methods in relation to learning outcomes

In order of reliability as indicators of successful learning outcomes this study recommends that the five methods be ranked as follows:

- Rotational Instrument Immersion Program
- Academic Ability
- Musical Aptitude Testing
- Timbre Preference (The Gordon Test)
- Student Choice

When using any testing method as a predictor of outcomes in general, it is imperative to fully comprehend the intended purpose of the method. Recognising that the application of each method is designed for a specific purpose, and acknowledging that not all testing methods will suit all students in all situations, is critical for the successful application of the methods. For example, musical aptitude testing can show existing musical ability, but establishing musical potential is a far more complex process.

Cutietta has well recognised this problem:

One thing that should never be done is to use a test to exclude a child from receiving music instruction. Every child has some degree of ability. A test can sometimes identify the child who will need extra help and experiences to reach her potential. Many teachers feel that they do not need a test to tell if someone has musical aptitude. They can just “see” it when working privately with a student…Still, tests can be very valuable, especially in school settings. Public school music teachers often meet with several hundred students each week. There is no possible way for them to identify the aptitude of all their students without the aid of a test. The danger is that some potentially talented child could get lost in the cracks. (Cutietta, 2001)

This study shows that potentially talented students will certainly be overlooked if methods such as academic and musical aptitude testing are used in isolation as selection criteria for instrumental music programs.
Gender, Physicality, Personality and Instrument Selection

On the issue of gender and instrument selection this study does, on the surface, appear to contradict some findings of existing studies in relation to instrument choices. Taken in context, this study has shown that regardless of gender, if students are given the opportunity to trial a variety of instruments, a shift in traditional gender associations with particular instruments may occur. This was particularly prevalent in relation to the number of boys electing to play flute after a trial period.

With regard to physical suitability to particular instruments this study finds that literature which strongly promotes pre-existing physical qualities as necessary for instrument compatibility should be used as a general guide only. The physical requirements and demands to play the band instruments examined in this study can usually be learned, developed and even overcome if the desire to play a particular instrument is strong. It was common throughout the course of this study for students to take several weeks to develop a playing embouchure, and produce the required tonguing techniques on the woodwind and brass instruments.

One school term proved to be a suitable amount of time to discover levels of suitability to particular instruments. Students who were unable to master the basic embouchure requirements of the instruments over this period of time were very unlikely to pursue these instruments as a final choice. These findings again point to the importance of creating a system that allows for flexibility of instrument choice.
The nature of the data in this study allows for some preliminary examination of achievement comparison in relation to the three broad personality or behavioural types identified. The questions raised in this chapter concerning personality in relation to instrument choice and achievement outcomes may never be comprehensively or scientifically answered. They are nonetheless, interesting to contemplate. Given the findings of this study it is reasonable to suggest that there is much scope for further research in this area and in developing a practical and reliable way of identifying and measuring the causes and effects of personality types on instrumental achievements.

**Revisiting the Literature**

Of the literature available to assist in making instrument choices, Ben-Tovim and Boyd’s *The Right Instrument for your Child* (1985) and Crozier’s *Musical Instruments for Children* (2007) have in common an organised layout and ease of referencing. Whilst the latter is more or less a condensed version of the former, they both offer highly accessible information and are an especially useful tool for parents with limited or no musical knowledge. It should be noted that the nature of the research methodology presented in these books is questionable, as they rely heavily on anecdotal evidence to support their findings. Having said this, the Ben-Tovim and Boyd book has sold thousands of copies each year since publication and was therefore important as a reference to this study.

Another area of literature offering a broader musical perspective includes Turner’s *Your Musical Child* (2004), Cutietta’s *Raising Musical Kids* (2001), Crease’s *Music Lessons* (2006) and Haroutounian’s *Kindling the Spark* (2006). These resources whilst still approachable, are more academic or intellectual in style, and would appeal to parents who approach music education from a holistic and philosophical viewpoint. From a
teaching perspective, they offer valuable and in-depth insights into learning methods, behaviours and styles and their successful application and development.

**Other Areas with Impact on Achievement: Practice, Instrument Quality and the Student/Teacher Relationship**

As this study’s focus was methods of instrument selection, it has not fully investigated on the issue of students’ individual practice, and the role it plays in achieving success on an instrument. Much of the literature aimed at helping parents, does however touch on this issue. There is also a common ground of opinion that the amount of practice time needed will vary between individual students and different instruments. The setting of this study was such that the students were charged with the responsibility of determining their practice routine within a given framework.

As Instrumental Music is a part of the core-curriculum in the school being studied, reporting for this subject formed a part of each student’s general academic report. One of the six criteria in the subject of Instrumental Music was “Preparedness for Learning”. Table 46 shows a section of the annual school issued diary where each student has a practice register which displays the grading descriptors for this criteria.
<table>
<thead>
<tr>
<th>Result</th>
<th>Practice Requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>5× 30 minutes practice per week</td>
</tr>
<tr>
<td>B</td>
<td>5× 20 minutes practice per week</td>
</tr>
<tr>
<td>C</td>
<td>5× 10 minutes practice per week</td>
</tr>
<tr>
<td>D</td>
<td>Less than required amount for C result</td>
</tr>
<tr>
<td>E</td>
<td>Little or no practice recorded</td>
</tr>
</tbody>
</table>

The responsibility was placed on each student to record his or her practice and have a parent/guardian or teacher (if the practice was completed at school) sign the diary each week. This approach was found to be age appropriate for late primary and early secondary students and highly effective in a school setting. It also effectively made reporting on this criterion very transparent. Some literature suggests using a reward system, which could work alongside or easily replace the above system where reporting is not feasible or even required. Certificates and other small merit awards can be an effective motivator in the primary age group.

Instrument quality is also worth mentioning here, as it is a factor that impacts on progress. Even in the beginning stages of learning, it is important that the instrument is functioning properly. In this study the instruments were pre-ordered and checked by the specialist instrumental teachers before the commencement of the program. Most issues with quality in a school setting occur when parents buy instruments second-hand or online, without first consulting their child’s instrumental teacher. An important finding of this study is that a high percentage of students do not continue with their initial first
choice of instrument, and therefore hiring through a school or reputable music store is a strong recommendation. This will alleviate situations where unnecessary pressure is placed on students to persevere with unsuitable instruments, due to prior financial outlay.

Another area that is frequently referred to in the literature mentioned above is the development of the relationship or rapport between the student and music teacher.

While there are many suggestions made in regard to finding the right teacher, all agree that this is an important factor and can be linked directly to student progress.

This study was conducted in an environment where all the instrumental music staff were permanent members of the academic teaching staff. It is the writer’s experience that within the private school sector these jobs are highly sought after, and there are usually many competitive applications for such positions. Similarly, the instrumental music teachers in Queensland State Schools are employed on a permanent basis and can visit as many as five schools per week. Other private schools employ instrumental teachers on a casual basis during term time only, and there will often be more than one person teaching the more popular instruments at the same school. Most literature suggests that when seeking tuition outside of a school or other music institution, it is advisable to make inquiries as to the level of experience and qualifications of the teacher to ensure they are appropriate to the needs of the student.

It was apparent from the surveys conducted in this study that the overwhelming majority of students found the teachers helpful and encouraging. The students were willing to take advice from the teachers in regard to instrument choice. This indicated that a level of trust and respect was established over the four-year period of the study.
The definitive effect of the student/teacher relationship is an area that is difficult to quantify in terms of progress and results, however it is an area deserving of further research.

**The Benefits of Instrumental Study**

The opinions and ideas expressed in the broad field of research to date, namely on the benefits of the study of instrumental music, are many and varied. One common element that pervades this research is the opinion that children will benefit in some way from learning to play a musical instrument. Just how much, in what ways, and how to measure it, are still questions which are open to much discussion and research.

Although the foundations for intelligent listening to music have not definitively been established, the value of some performance experience, however modest, is assumed to be helpful. It appears that singing in an ensemble or playing in a band or orchestra has long-term benefits for everyone. (Colwell, 1996)

Children who study music at all rigorously tend to be better cultivated humans. They have more resolve, more persistence, more self-discipline, and more wide-ranging interests. (Crease, 2006)

Fowler and Cutietta capture the essence of what a music educator, or indeed an arts teacher of any kind, should try to keep at the forefront of their minds. If we set about teaching with the specific intent of trying to produce professional musicians, actors, painters, and dances, we are not only bound for disappointment but we are missing the point. While teachers will occasionally encounter a student who is capable of great things, or who displays a passion for the arts, and who subsequently follows their artistic ability into a rewarding and successful career or hobby. What teachers need to appreciate more than anything else is that by presenting children with the opportunity to study the arts, they will be better educated and richer people as a result of the experience.
The arts are a part of what makes people well educated. Take them away and people will be less well educated. There is no replacement. You either acquire the capacity to unlock artistic insights and responses, or you are deprived of these insights and the joys they offer. Children made to live without the arts are inevitably poorer for it. This is why every young person, without exception, should be given access to the study of the arts, not to become an artist, but to be better educated. (Fowler, 1996)

When our children study music, they should do so to become musical and develop the musical parts of their brains. These musical children will receive those benefits as a freebie. Now that is a great deal. (Cutietta, 2001)

Due to the difficult nature of measuring the benefits of instrumental study we may never be able to satisfactorily or scientifically answer these types of questions. If we value artistic endeavours as a society, it is however important that research continues in these areas. Fowler recognises the importance of including arts in the school curriculum.

Among all the subjects in the curriculum, the arts are unique in that there are fewer absolutely right or wrong answers. It is precisely the ambiguities of these forms of symbolic expression that require us to exercise a higher order of thought processes. (Fowler, 1996)

**In Conclusion**

It has become clear over the course of this research that almost every child can have a positive learning experience when given the opportunity to find an appropriate instrument. It is my belief however, that having the right support structure and systems in place to allow this to happen will be the biggest challenge facing both government and independent schools. The real challenge of making this type of opportunity available for the majority of children often lies in convincing the boards and authorities that control the funding for these programs, of the educational value and benefits that this experience provides. In doing this it is tempting to justify an arts program on the basis of the added benefits to other areas of study, when there are clearly enough benefits for arts programs to stand alongside as an equal to programs in other areas. Jorgensen demonstrates how fragile arts programs can become when the content is largely decided by external authorities.
State officials and their representatives shape the musical knowledge considered to be legitimate, enact policies that ensure these objectives will be met, and devise methods for musical instruction consistent with their enunciated objectives. (Jorgensen, 1997)

Cutietta, Lindeman and Metcalfe all suggest that schools have an obligation to provide arts education to every child.

As our understanding of the brain increases, it is becoming clear that by and large we have underestimated the extent of mental abilities that must be developed in childhood. It is conceivable that at some point in the future schools that restrict their instruction to the so called academics without giving equal attention to the rest of the child’s mental development could conceivably be held accountable for neglecting their mission to educate children. (Cutietta, 2001)

Those of us who care deeply about music must be strong advocates to ensure that all children—no matter where in the world they live—have access to a quality music education. Sadly many children are denied that access and never have the opportunity to experience the joy of studying and making music. This simply is not acceptable. (Lindeman, 2007)

The richness and diversity in school culture is, as this research demonstrated, a decisive factor for many parents selecting schools for their children. Metcalfe shares a parent view that is still very current and typical:

I want the education you’d expect plus other things we cannot give at home, like extra languages and music. I want the school to foster different sorts of talents without knowing what these talents might be. It should be a creative environment, with lots of different ideas that will stimulate aspects in the children. (Metcalfe, 2006)

Claims of justifying music study for increasing math or other skills demean the true value of music and learning about it. (Cutietta, 2001)

Although all of these statements are very true, it is my experience that arts programs come under the closest scrutiny and face the biggest cuts in budget when schools face financial hardships. Directors of arts programs are put in positions of having to justify the value of their programs under circumstances where they are suddenly regarded as less important, or even worse, non-essential. One example the writer can share from first-hand experience is having had to explain to a principal that instrumental music
cannot be taught in exactly the same as Mathematics or English—in classes of 25 to 30 students!

As well as convincing boards and authorities there is often the added challenge of convincing parents, who have had little or no exposure to the arts, of the benefits of music education. Telling the same people that if their child studies a musical instrument it might increase his literacy or numeracy ability, and they suddenly see the value.

By in-depth examination of instrument selection methods it is hoped that this research will contribute to the knowledge base and overall efficiency of instrumental music programs in school settings.

There is no doubt that finding an appropriate instrument for each student is critical for successful outcomes to occur. What is more critical however, is the way we go about determining this choice and the programs that we put in place to make this possible. Giving instrumental music a stand-alone position as a subject in the core curriculum will ensure that successful outcomes for all students can become a reality.
Bibliography


