Teaching Strategies for Gifted Students in Mathematics and Literacy

A Case Study in a New Zealand Primary School

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Abstract

To date there is little New Zealand based research of gifted students in their regular classrooms and to address this issue, this qualitative case study has been undertaken. Three research aims firstly examine the strategies regular classroom teachers use to provide teaching and learning experiences in mathematics and literacy to cater for the identified needs of gifted students; investigate the views of the teachers and gifted students about teaching and learning programmes in mathematics literacy, and lastly provide descriptive examples of how teachers in Years 4-6 primary school classrooms are catering for their gifted students' diverse learning needs. Data has been gathered through observations of teachers and gifted students in their classroom environments using a Classroom Observation Focus, by conducting semi-structured interviews of both teachers and gifted students, and through document collection. An analysis of the data identified themes that have contributed to the findings of this research.

The teachers in this research represent a range of teaching experiences with each teacher having different opportunities to work with gifted students. All of the teachers saw their role in the classroom as one of assessing and teaching to their students' learning needs. These research findings provide important discussion points about the similarities between the strategies used by the three teachers in mathematics and literacy teaching. The findings also suggest successful teaching strategies to promote gifted students' learning, in mathematics and literacy, are reliant on the teacher's understanding of giftedness and their understanding of the processes of differentiation as a way to provide for gifted learners in the regular classroom environment.

Research findings also indicate that the perspectives of the gifted students, determined by eliciting their views on what was happening in their classrooms, are pivotal in ensuring a gifted student's learning needs are catered for. It is important then for teachers to consider how they are providing challenge, choice, and flexibility for these unique and diverse students within the regular classroom environment.

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Thank you to the student participants and to their families. I have uncovered much about the thoughts, feelings, and behaviours of young gifted learners. I am hopeful this research may enhance our collective understanding about the 'gifted experience' in New Zealand primary school classrooms. To the gifted students whom I have had the privilege to meet and interact with in the past, you ignited my interest in gifted education and encouraged me to make the classroom a place of 'learning' for you all.

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Chapter One

Introduction

Gifted students in New Zealand are an understudied population. To date much of the research covering giftedness and gifted education has emanated from the North American, English or Australian experiences and these perspectives, while not to be discounted, are not necessarily focused to determine appropriate teaching practice in the New Zealand educational environment. In January 2005 changes to the New Zealand National Administration Guidelines (NAGS) came into effect requiring schools to provide for their gifted students in the same way that they address the needs of students "who are not achieving, those at risk of not achieving, and those with special needs" (Ministry of Education, 2004, p.1). These changes have significant implications for New Zealand teachers in the way the special learning needs of gifted students should be catered for in classrooms and these changes require study.

Research already conducted into the educational needs of gifted students in New Zealand primary schools (Bicknell & Riley, 2006; Bourne & Sturgess, 2006; McDonough & Rutherford, 2004; Moltzen, 1996; Riley, Bevan-Brown, Bicknell, Carroll-Lind, & Kearney, 2004) focuses on school-wide provisions, but there is no clear understanding of the provisions teachers make in their classrooms for these students. Consequently there is a knowledge gap about the strategies utilised by teachers within their classroom environments to meet the learning needs of gifted students. Primary school students in New Zealand spend around a thousand hours per year in their classroom (Cathcart, 2006). If this setting continues to be ignored, as the principle learning context for gifted students, there is a real risk that gifted students will be abandoned to spend much of their classroom day with their learning needs unrecognised and unfulfilled.

The reasons behind not modifying curricula or altering instructional practices for gifted students in New Zealand primary schools are many and varied and continue to be influenced by our strong egalitarian history. There also exists a plethora of misinformation and misunderstanding about who gifted students are, what their learning needs may be, and more importantly, how to cater for these learning needs within the primary school context. The gifted student in today's New Zealand primary school classroom may therefore have the potential to succeed but not have the opportunity to demonstrate achievement.

The role of the classroom teacher is crucial in determining the success of gifted education. In the New Zealand education system most gifted students spend their school lives in the regular classroom with teachers who are expected to cater for students' cognitive and affective needs. As Croft (2003) records, gifted students appear to be "more profoundly impacted by their teachers' attitudes and actions than other students" (p. 358). Perhaps this is because a gifted student's learning needs are more individualistic, dynamic, and diverse than those of non gifted students.

In an attempt to highlight the role of the regular classroom teacher and to describe the reality for gifted students, this thesis examines the practices of three New Zealand primary school teachers in Years 4-6 classrooms during the teaching and learning of mathematics and literacy. The differentiation of classroom programmes in mathematics and literacy were determined and the impact on gifted students examined. Both the teachers' and the gifted students' views were scrutinized with regard to current literature in this field and recommendations for classroom practice have been made.

Background to this Research

This research, motivated by my strong interest in gifted education, was also inspired by a chance encounter with a profoundly gifted seven year old. This student stretched my knowledge about giftedness and ignited a commitment to ensure he was provided with opportunities for new learning in the classroom. Turning to post graduate studies to extend my knowledge of giftedness, it became clear what was advocated for by research

and the reality of teaching and learning in regular primary school classrooms in New Zealand were two different scenarios.

Many of the programmes and provisions for gifted students presently utilised in primary school classrooms are built on research from overseas and this is often a difficult 'fit' into the New Zealand educational context. It was also clear that despite the best efforts of a few, gifted education in New Zealand still remains tainted by a relentless need to cut down the 'tall poppies', especially in the academic realm (Cathcart, 2006; Fraser, 2004; Moltzen, 2004). Also apparent is the influence myths about giftedness and gifted education have on what happens in a classroom. One of the most damaging myths is that gifted students can be expected to 'make it on their own' (Winner, 1996). For some teachers, this view of giftedness equates with 'do nothing' as the teacher believes a gifted student will learn no matter what happens within the classroom context. In contrast, teachers do not expect other students with special learning needs to be left to their own devices in the classroom.

Cathcart (2006) and others agree while some changes have been made in promoting gifted education in New Zealand , there is still some distance to go to make effective provisions for gifted students in the same way that the special learning needs of other groups of students are recognised and catered for. Research conducted by Riley et al (2004) centred on the extent, nature, and effectiveness of school based provisions for gifted students in New Zealand. A significant outcome was while provisions for gifted students may include a "smorgasbord of opportunities (which) allows for choice, flexibility, and variety in the ways schools meet the needs of gifted and talented students" (Riley & Bicknell, 2005, p. 74), these provisions may be inconsistent across schools and within classrooms. The research by Riley et al also stressed that in the New Zealand educational setting, especially in primary schools, the majority of any gifted students' schooling is spent in their regular classroom engaging in learning activities in ability groups. Whether these ability groups are homogenous or heterogeneous, there exists a very real possibility that little modification of the curriculum, or flexibility in altering the

learning environment to meet the specific learning needs of gifted students, may be happening.

Contributing to the slowness in responding to the needs of gifted students is that many classroom teachers do not always have a clear idea of the many facets of giftedness and how these may be manifested in the classroom setting, or have the knowledge of skills and strategies needed to teach these gifted students (Archambault, 1993; Freeman, 1998; Gross, 1994; Hall, 2001; Hargrove, 2005; Rogers, 2007; Westberg, 1995). Also, misconceptions about what constitutes giftedness and the difficulties in determining how to define and identify gifted students further acts to compound confusion for classroom teachers. It seems too, being 'gifted' has to be made more palatable in the New Zealand educational context by being tagged with 'talented' which raises additional questions about how to define and distinguish between the two and making it difficult for teachers to understand who a gifted student might be. Many schools also lack policies to drive appropriate classroom practices (Riley et al, 2004) and with perennial funding issues, there is often inadequate resource allocation designated to support gifted education provisions.

From classroom experiences and from working with teachers in the field of gifted education, it has become apparent to me teachers are 'expected' to add to their ever growing repertoire of skills those which will enable appropriate definition, identification, and programming for gifted students. From the expectations of parents and caregivers and the wider school community to Ministry of Education requirements, teachers have an ever increasing workload, including how to provide appropriately for gifted students. It becomes necessary then, to determine the reality for teachers and the gifted student in the classroom context. To capture the interaction between teachers and their gifted students, this research describes how the identified learning needs of gifted students are accommodated in mathematics and literacy.

These curriculum areas were chosen because there has been nationwide professional development programmes available to schools to develop sound practice in the way these

core curriculum areas are taught. In primary schools, literacy is defined as the reading, writing, listening, and speaking activities that students engage in (Ministry of Education, 2006). In this research mathematics encompasses the mathematical concepts of number and statistics and their related processes of problem-solving, communicating mathematical ideas, and reasoning (Ministry of Education, 1992). Mathematics and literacy also offer a daily view of classroom interaction between gifted students and their teachers and they are also most likely to be the specific areas of strength identified by classroom teachers.

Additionally, these areas of the curriculum lend themselves to flexible programming options and differentiation of content, process, product, and the learning environment. As Cassady, Spiers Neumeister, Adams, Cross, Dixon, and Pierce (2004) record differentiation is needed because there can be little challenge in the regular classroom curriculum and because gifted students are likely to have already mastered the content and skills within the 'aged related' curriculum. Most importantly, these two core curriculum areas form a large part of any student's day, including the gifted, and therefore providing differentiated programmes for gifted students becomes a significant challenge for the regular classroom teacher.

There is an advantage to New Zealand education, however, in the way the curriculum is constructed. Unlike many overseas countries where research of gifted students is undertaken, New Zealand's curriculum documents are not 'age-locked'. Accordingly, there is scope for gifted students to learn at their own pace and at a level advanced of their same aged peers. Readers should also note that in 2007 the New Zealand Ministry of Education released a new curriculum document which presents eight specific learning areas including English, Mathematics and Statistics, Social Sciences, and The Arts. These learning areas, while distinct, are not to "limit the ways in which schools structure the learning experiences offered to students" (Ministry of Education, 2007, p. 16). As these changes are not yet fully implemented they have not had an impact on the findings of this research, however, readers should be aware of these influences when interpreting this research in the future.

Earlier international research (Archambault et al, 1993; Knight & Becker, 2000; Westberg, 1995; Westberg & Archambault, 1997) provided information on educational practice in gifted education, suitable curriculum options, and differentiation practices as well as outlining teaching and learning strategies effective for gifted students and the ways they like to learn (Tomlinson, 2001; 1995; Van Tassel-Baska, 2000; 1994). However, the instructional strategies used by teachers in the regular classroom still remain one of most understudied aspects of gifted education. Some researchers (Gallagher, 2000; Mills, 2003; Tomlinson, 1995; Van Tassel-Baska, 2000) have determined teachers need a repertoire of teaching skills and strategies to meet the individual learning styles of gifted students, however, there is little research describing "engaged practices (and) demonstrating how that content could be delivered" (Graffam, 2006, p. 120).

The motivation for this research therefore has developed through personal teaching practice, through involvement with gifted students, their parents and caregivers, and through contact with teaching colleagues. The research focus of interest is the instructional strategies and tools teachers utilise to effectively provide appropriate, challenging, and flexible programmes for gifted students. This thesis explores the experiences of teachers who have gifted students in their classrooms through observations and interviews. It also investigates the interactions between gifted students and their teachers and examines gifted students' perspectives about their classroom learning.

Callahan (2000) records that gaining knowledge of giftedness and how to identify gifted students is of little value unless teachers can "create learning experiences that reflect an attempt to modify the learning experience" (p. 59). Therefore, teachers need to make changes to their classroom practices as a result of what they may have learned about gifted students. Given there is a paucity of New Zealand based research on gifted students and their teachers in regular classroom settings, this thesis attempts to describe how the classroom teacher manages the many and varied aspects of teaching and learning

to provide programmes which ensure that what happens in the classroom is a positive and worthwhile learning experience for gifted students.

Purpose of the Research

The purpose of this thesis is to answer the research question: 'what strategies do New Zealand primary school teachers use in their classrooms (Years 4-6) to provide teaching and learning experiences in mathematics and literacy, which cater for the identified needs of a gifted student?' To answer this question, three main aims emerged:

- To examine the strategies teachers use to provide teaching and learning experiences in mathematics and literacy that cater for the identified needs of gifted students.
- To investigate the views of both the teachers and the gifted students about the teaching and learning programmes in mathematics and literacy.
- To provide descriptive examples of how teachers in Years 4-6 primary school classrooms are catering for gifted students' diverse learning needs.

The case study methodology was used because it allowed an in-depth understanding of the interactions and interrelationships of the participants in the classroom environment. Data has been collected from various sources and triangulated to give rigour to the data analysis allowing generalisations to be drawn. The methodology also allowed me to be absorbed into the learning environments and enabled descriptions of the interactions between the participants to be recorded. The research findings provide descriptions to challenge the reader and foster a reflective evaluation of teaching practices.

Organisation of the Thesis

Chapter Two presents the Literature Review. This is set out under four frameworks which explore giftedness and gifted education, provide an overview of gifted education in New Zealand, and outline gifted education for mathematically gifted students and students gifted in literacy. The Literature Review also clarifies what giftedness is within the New Zealand school environment and the teaching and learning methods, identified through research, which effectively cater for gifted students within the regular classroom setting.

Literature linking classroom methods with what gifted students want from their teachers and the characteristics deemed necessary to teach gifted students are discussed.

Chapter Three outlines the structure of the research process and how the research was conducted. The research design is a qualitative case study chosen because rich descriptive language and observations can provide readers with an insight into the dynamics between gifted students and their teachers. This Chapter also contains a detailed description of the case study methodology used to conduct this research, considers ethical issues inherent and pertinent to the research, and also details the aspects of data analysis.

In Chapter Four, observations of three teachers and their interactions with gifted students in classrooms during mathematics and literacy lessons are described. Also detailed are the findings from the following information sources; teacher interviews, interviews with twelve gifted students, and document analysis.

Chapter Five examines the findings in relation to the Literature Review presented in Chapter Two. From these results, key teaching and learning strategies contributing to effective teaching of gifted students within regular Years 4-6 primary school classrooms, are identified. Limitations to the research are also discussed in this Chapter.

In Chapter Six, conclusions related to teaching strategies for gifted Years 4-6 students in the classroom during mathematics and literacy sessions are drawn together. This Chapter also includes recommendations and provides suggestions for further research into teaching practices for gifted students in regular classroom settings.

Summary

Gifted education is more than just defining and identifying gifted students, it is about managing and promoting the optimum learning and teaching environments for these students through informed teaching practices. Inherent in these provisions is the role of the classroom teacher. Gifted students, in New Zealand, begin their formal educational journey in primary school classrooms. For classrooms to be effective learning contexts

for gifted students, teachers should be aware of and have at their disposal the resources and structures that sanction and maintain classroom teaching and learning opportunities.

Classroom teaching should facilitate learning matched to the level, pace, interests, and learning styles of any gifted student. The influences affecting mathematics and literacy teaching and learning for gifted students include the knowledge the teacher has of giftedness and the basis used to determine the best instructional strategies to use in these specific curriculum areas. The perspectives of the gifted students are important too and combined with findings from the data collected for this thesis, form a report on the interactions of gifted students and their teachers in New Zealand Years 4-6 primary school classrooms during mathematics and literacy sessions. Through critical reflection and analyses of many elements, this research uncovers the multiple factors contributing to the provisions of appropriate teaching and learning opportunities for gifted students.

Chapter Two

Literature Review

Who are the Gifted?

Research undertaken in the field of gifted education concludes the most capable learners are often the ones who benefit least from days spent 'learning' in their classroom (Clark, 2008; Freeman, 1998; Gallagher, 2000; Knight & Becker, 2000; Rogers, 2007). Gifted students may also be the least challenged because they enter the classroom with advanced knowledge and an ability to learn at a faster rate than their same-age peers. These gifted learners differ from their classmates in three significant learning areas, their pace of learning, their depth of understanding, and their interests (Gagne, 2007). There is concern this range in academic capacity within a classroom, possibly as much as five years, makes it difficult for teachers to tailor learning to meet individual needs. What also complicates matters is there is no universally agreed definition of giftedness with no one characteristic of giftedness holding true for all gifted students in every learning situation.

Gross (1994) records the most powerful indicators of giftedness to be early reading and precocity, with Kanevsky (1995) citing the most distinguishing characteristics of a gifted student to be the pace and nature of their learning. Deciding who the gifted are and defining the characteristics and behaviours they may possess therefore is a difficult undertaking. If gifted students do not 'look alike' or 'act alike' then there can be no one single solution for meeting their educational needs (Clark, 2008; Maker & Schiever, 2005; Tomlinson & Dockterman, 2002). Gifted students therefore display a broad range of abilities; however, they could also have learning disabilities which make meeting their learning needs even more difficult. For instance, a gifted student with an advanced

vocabulary may not be able to record their ideas in written form resulting in frustration for them and misunderstanding by the teacher. In the classroom the teacher may then focus only on what the gifted student cannot do, rather than developing the skills they already possess.

Defining Gifted Students

As suggested earlier, defining 'giftedness' has proven to be an exacting task and definitions are challenged when societies search for more informed ways to identify this construct (Gallagher, 2000). Giftedness has evolved from definitions based solely on intelligence testing that portrayed giftedness as a measurement of intelligence quotient (IQ) and evidenced in schools by high marks or outstanding achievement (Terman, 1919). If giftedness can be measured by an IQ score then a student can be moderately gifted with an IQ score of 130+, highly gifted with an IQ score of 145+, exceptionally gifted with an IQ score over 160, and profoundly gifted with an IQ score over 180. Table 2.1 shows the range of IQ scores, gives a description of giftedness, and the prevalence of giftedness in the population (Gross, 1994; 2000). However, Gagne (2007) states if giftedness is measured in this way it is important to acknowledge "the relative rarity" (p.98) of exceptionally gifted students and to be aware of the possibility that mildly gifted students may be more prevalent in classrooms.

Table 2.1 IQ Scores and Levels of Giftedness

Level	IQ Range	Prevalence
Mildly (or basically) Gifted	115 - 129	1:6 - 1:44
Moderately Gifted	130 - 144	1:44 - 1:1,000
Highly Gifted	145 - 159	1:1,000 - 1:10,000
Exceptionally Gifted	160 - 179	1:10,000 - 1:1 million
Profoundly Gifted	180+	Fewer than 1:1 million

The cognitive and affective needs gifted students are also vastly different for those students who are moderately gifted compared to those students who maybe profoundly gifted. This suggests gifted students are not only qualitatively different from their

'average peers' but are also qualitatively different from each other (Gagne, 2007). A broader understanding of giftedness was proposed in Renzulli's Three-Ring conception of giftedness. He proposed gifted behaviours such as task commitment, above average ability, and creativity could be evidenced in certain people, at certain times, and under certain circumstances (Renzulli, 2008). Characteristics of giftedness could include:

- early and rapid learning,
- superior language ability,
- reasoning and problem solving skills,
- advanced interests,
- curiosity,
- a preference for novelty, and
- perfectionist tendencies.

(Colangelo & Davis, 2003; Davis & Rimm, 1998; Gallagher & Gallagher, 1994)

The affective characteristics of giftedness may include perseverance, patience, or idealism with imagination, divergent thinking, and sustained concentration being indicators of cognitive giftedness (Clark, 2008). These characteristics are by no means an exhaustive list and research shows gifted students have many diverse characteristics and behaviours and come from varied social, economic, and cultural groups. As a consequence the 'gifted' do not form a homogenous group (Bevan-Brown, 1996; Freeman, 1998; Gross, 1994; Winner, 1996). It is also noted a gifted student's chronological, social, emotional, and cognitive development may be asynchronous, causing them to be out of step, not with only their same aged peers, but also with other gifted students and also within themselves (Clark, 2008). For example, a young gifted student may spend hours worrying about world poverty but not have the emotional or social development to put problems into perspective or rationalise solutions.

Gallagher (2000) suggests giftedness is a 'social construct' which was created for social and educational purposes much like the construct of 'athletic ability'. However, he further suggests it is not how the term giftedness has been defined but "whether the social construct is educationally useful or not" (p. 6). Seen in this way, the purpose of defining

and identifying gifted students should be viewed from the perspective of what is to be done once giftedness has been acknowledged. Gifted education should therefore promote a fluid and multi-categorical definition of giftedness and include identification of the potential to learn as well as recognising demonstrated achievement. As Callahan (2001) records, giftedness is often apparent before students come to school, so it becomes the schools' and the teachers' responsibility to further develop the potential of a gifted child.

The first New Zealand perspective of gifted students was recorded in the 1940s when George Parkyn studied 'students of high intelligence' and now New Zealand primary school teachers refer to students as 'gifted' or 'gifted and talented'. Unlike other countries, New Zealand does not have an 'official' definition of giftedness but instead all schools develop their own definition based on multi-categorical concepts influenced by their own particular cultural perspectives (Bourne & Sturgess, 2006; McDonough, 2004). In New Zealand there also persists a cultural view that gifted students are elite or privileged (Bourne & Sturgess, 2006; Hall, 2003) leading to assumptions about how gifted students should be defined, identified, and taught.

Educational guidelines published by the New Zealand Ministry of Education, for example, *Gifted and Talented Students: Meeting Their Needs in New Zealand Schools* (Ministry of Education, 2000) help schools develop definitions of giftedness including ideas such as, each gifted student is "unique, with his or her own set of behaviours and characteristics" (p. 25) and that giftedness can be manifested in many different domains, for example, cognitive, affective, spiritual, linguistic, artistic, psychomotor, and leadership areas. Additionally, giftedness should be acknowledged as being different from the potential or demonstrated achievement of same aged peers or other gifted students. Also requiring consideration is that giftedness is sensitive to time, place, gender, social values, and cultural influences (McAlpine, 2004). In the New Zealand context Bevan-Brown (1996) argues that any definition of giftedness for Māori students should reflect Māori cultural practices, attitudes, customs, values, and beliefs.

Specific Learning Characteristics of Gifted Students

Gifted students learn in ways that are different from their same aged classmates because they learn new material more quickly, remember what they have learned, and can become passionately involved in certain topics. Winebrenner (2000) suggests gifted students can also operate on many different levels of concentration evidenced by appearing not to pay attention to verbal instruction but still being able to monitor content. Other commonly acknowledged learning characteristics of gifted learners outlined by Clark (2008), Garrett (2004), and Mulhern (2003) include:

- the ability to comprehend complex and abstract material,
- displaying precocious thinking skills,
- greater independence and self-initiative than average ability classmates,
- advanced verbal abilities,
- reading widely and displaying a greater interest in reading than same aged peers, and
- having the potential to acquire knowledge more quickly using intuition and making connections between knowledge.

Researchers, including Risemberg and Zimmerman (1992), conclude gifted students have a preference for self regulated learning because they are independent, favour individualised study to whole class instruction, prefer less teacher monitoring of their performance, and like to control the pace of their learning. Gifted students too may not be the teacher pleaser or be well behaved in the classroom. They can be impatient and disruptive, perfectionists, daydreamers, or the student who has all the answers but never writes them down.

Gifted students may also be ambitious and articulate or conversely anti social and awkward. Betts and Neihart (1988) refer to these subtypes of giftedness as the dropout, the challenging, the underground, and the successful. It is easy to see from these profiles that there is no stereotypical image of a gifted student. Other behaviours gifted students may display in the classroom setting include being highly curious, showing strong feelings and voicing strong opinions, appearing to play around in class but testing well, and needing only one or two repetitions to achieve mastery. It is a common perception

gifted students often prefer the company of adults and enjoy discussing content in detail. This reiterates the point that any gifted student may have unique behaviours with unique social, emotional, cultural, physical, and intellectual needs. However there may be impediments, such as the myths and misconceptions surrounding giftedness, which prevent the varied and divergent learning characteristics of gifted students from being acknowledged in the classroom context

Myths Surrounding Giftedness

Myths about giftedness form barriers to the provisions which teachers might select to meet the learning needs of gifted students. Misconceptions, for example, 'gifted kids are so smart they can virtually teach themselves', can lead teachers, parents, and caregivers to believe that nothing 'special' is required to be done for these students (Callahan, 2001; Winner, 1996; Clark, 2008). Conversely, gifted students can lose motivation, remain unchallenged, and lose interest in school and the learning process itself if their giftedness is not acknowledged. The myth that all gifted students excel in school in all subjects is also another common misunderstanding that does not take into account specific subject giftedness or gifted but learning disabled. In fact, gifted students may not be independent self-regulating learners and may not have developed skills, such as how to make choices or how to self-evaluate their progress, which can impede their learning or misrepresent their true ability (Tomlinson, 1993).

Moltzen (1996) and Braggett and Moltzen (2000) record that egalitarian attitudes have been a restraining influence on educational provisions for gifted students in New Zealand resulting in gifted students whiling away their school hours doing more of the same. As Gross (1994) suggests, we do not stop young children from walking even if they reach that developmental milestone earlier than their peers, but there is an expectation gifted students will be educated based on a birth date rather than letting the academic, social, and emotional characteristics of giftedness form the basis of educational provisions. The myth that gifted students are alike and form a homogenous group can also help maintain classroom responses where gifted students are treated the same with little regard for their diverse ability levels.

Valpied (2005) records although gifted students are different from each other in many ways, they do share some attributes such as the complexity and intensity of experiences. For instance, a gifted student may be totally engrossed in complex tasks but cannot manage to complete simple ones, or is thought to be daydreaming when actually they may be thinking of questions or content far advanced of the subject at hand. Valpied also suggests misinterpreting gifted behaviours then leads to inappropriate learning provisions where the specific learning needs of a gifted student may be overlooked or even construed as being the opposite of what is needed.

'All students are gifted' is another misconception that influences provisions teachers make. Educational provisions for gifted students should not be dictated to by an 'everyone must have their turn' mentality but instead the content and instruction of skills and processes should be attuned to the needs of gifted students so they can become successful learners in the classroom environment. Successful learners are those students who are self directed, motivated and who take an active role in the learning process (Moore, 2005; McGrail, 1998). Even though gifted students may have the potential to achieve, as stated previously, many are not self-regulated learners and are not successful learners in the classroom context. Therefore gifted students may remain unidentified and underachieving in the primary school classroom

However, despite the myths that surround giftedness and the misconceptions and misunderstandings about who may be gifted, it is important in the school setting for teachers to persevere to gain understanding about the different facets of giftedness so they can identify the gifted students in their classrooms. From their respective definitions and understanding of giftedness, New Zealand schools are encouraged to employ multiple identification tools to 'find' their gifted students (Ministry of Education, 2000). Identification tools used to assess student performance and potential include:

- teacher observation and nomination,
- parental observation and nomination,
- student portfolios and products,
- anecdotal records, standardised tests, and rating scales,

- creativity tests,
- behavioural and characteristic traits checklists,
- peer and self nomination, and
- formal assessments from specialists such as education psychologists.

Identification processes and methods used by schools should include multi-categorical concepts of the characteristics and behaviours of giftedness and be a continuous team approach involving all personnel connected with the gifted student (Ministry of Education, 2000). The identification strategies developed by schools should also recognise potential as well as achievement and be robust enough to identify the diverse, unique, and dynamic characteristics of gifted students. In this way schools and teachers are demonstrating their understanding of the uniqueness of the learning needs and respecting the learning differences of gifted students. For instance, some gifted students may prefer to work alone but with opportunities for group involvement. Others may prefer a structured environment with open-ended tasks or a balance of teacher-directed and student-directed lessons. Some gifted students may need fast paced instruction or access to an accelerated curriculum.

Teaching Gifted Students

Teaching gifted students requires a particular approach from the classroom teacher. Whitton and Noseworthy (2002) and Feldhusen, Van Tassel-Baska, and Seeley (1989) suggest teaching approaches which match gifted students' learning needs should incorporate "fast paced, high level, conceptually oriented learning activities, in large challenging chunks taught in a dynamic and interactive style" (p. 55). Like all other learners, gifted students need to be able to enjoy the challenge of learning something new and have an opportunity to show what they have learned (Rowley, 2004; Winebrenner, 1992). For many gifted students however, these opportunities do not always surface in their regular classroom. The learning provisions teachers employ when teaching gifted students within the regular classroom environment, such as, adapting classwork to meet individual learning styles, accelerating the pace at which content is presented, and

allowing gifted students to learn at a faster rate than their same aged peers, are all strategies that present gifted students with the challenge they require to be learning new concepts.

Algozzine and Ysseldyke (2006), Clark (2008), Hill (2005), Knight and Becker (2000), McGrail (1998), Pohl (1995), Pyryt and Bosetti (2006), Rogers (2006), Van Tassel-Baska (2000), and Winebrenner (1992) consider strategies effective in meeting gifted students' individual learning needs in the classroom environment to include:

- giving gifted students credit for prior knowledge,
- less repetition by providing alternative challenging activities instead of practice,
- accelerating the pace to allow access to higher levels of objectives,
- building independent projects around gifted students' interests,
- offering flexibility in the way gifted students spend their time,
- doubling or tripling time spent in mathematics and science,
- using discovery learning techniques,
- using challenging questions to extend thinking,
- explicit teaching and modeling of tools and strategies of thinking,
- adding breadth to learning experiences with a broad range of tasks, texts and materials, and
- providing opportunities for students to explore complex concepts.

It is also important for teachers to consider ways for gifted students to have an opportunity to interact with like-minded students, to find 'kids just like them' for peer support and collaboration opportunities as well as providing experiences where gifted students can set goals and evaluate their own work.

Grouping

Cathcart (2005) suggests grouping is the first step towards providing for gifted students as it provides the basis for the differentiation of instruction and content to take place. Whether grouping is heterogeneous or homogenous there are perceived benefits and weaknesses as evidenced in the results of a meta analysis by Slavin (cited in Kulik, 2003)

and Kulik and Kulik (1992). Also evident in the research by Riley et al (2004) was that grouping emerged as the most commonly reported strategy used by New Zealand teachers to cater for gifted students. Therefore, if grouping is widely used in the teaching of gifted students in New Zealand classrooms, it is important to note the instructional strategies used by teachers working with groups of students have a greater effect on a student's achievement than actual membership of the group (Rogers, 1993).

Groups are often organised within the classroom based on ability and when there are no other students at the same ability level, the gifted student may find themselves having individualised instruction or conversely be included in a group with other students of 'approximately' the same ability resulting in a wide range of abilities within a group (Kulik & Kulik, 1992). Huss (2006) recommends while gifted students should work together in groups in their areas of greatest strength, for at least part of the school day, flexible grouping should be used when a gifted student is ahead of their same-aged peers in one or more curriculum areas but at the same level as expected for their chronological age in other areas.

Grouping also demands careful assessment of content and processes to ensure group instruction does not engage gifted students in meaningless activity. Fiedler, Lange, and Winebrenner (1993), Huss (2006) and Van Tassel-Baska (1994) recommend heterogeneous grouping for gifted students when working on open-ended problems or when concepts are challenging and new to all students and homogenous grouping to address skill development or when reviewing material already learned. Coleman (2005) highlights effective group strategies as differentiating tasks to acknowledge students' learning levels, using a variety of materials so students can "move at their own learning rate" (p. 526) and assessment of the group's dynamics and problem-solving skills. Such strategies encompass choice and challenge which in turn help to facilitate the gifted student's participation within a group and maximise their opportunity for learning. Conversely, working in co-operative groups can be an unfulfilling activity for gifted students if they are constantly 'teaching' material to other students and not having the opportunity to learn new material themselves.

Curriculum

Smee (2005) records a curriculum for gifted students needs to be "sensitive to the 'inner world' of the gifted" (p. 20) with gifted students' attitudes to learning taken into consideration so their confidence as learners can be fostered. Algozzine and Ysseldyke (2006) state that everything written about teaching gifted students stresses the "importance of modifying the curricula content beyond presentation of simple facts, rules, and details to identification of complex issues, and solutions to problems" (p. 47). Bourne and Sturgess (2006) record the New Zealand Curriculum Framework (NZCF) is not 'age locked' and does not set out to restrict the content of what can be learned to a student's chronological age or year group.

Theoretically in the New Zealand educational context, as a student masters content and skills in one area they should be able to progress to the next level. For example, the mathematics and literacy curricula allow teachers the flexibility to adjust their learning and teaching programmes to meet the individual needs of students. If a student has already mastered mathematical skills and content knowledge they can be exposed to new content and processes by several means including acceleration within the classroom, acceleration within the school to a higher year level or using The Correspondence School for advanced instruction. In literacy, the skills and processes, such as comprehension strategies or writing in different genres can be taught as the student needs to acquire mastery to move forward in their learning. As Van Tassel–Baska (2003) argues, an effective curriculum for gifted learners includes "strategies that accelerate and deepen student understanding of key skills and concepts" (p. 51) and central to the effectiveness of the curriculum offered to gifted students is the ability of the classroom teacher to translate the curricula content into differentiated tasks and products.

However, a barrier to gifted students accessing appropriate curricula is the classroom teacher's ability to respond to a gifted student's particular learning needs and the way in which the student's readiness to learn is understood. If it is acknowledged that all New Zealand classrooms will have gifted students in their midst then, by default, all New Zealand teachers become teachers of the gifted.

Teaching Gifted Students in New Zealand Primary School Classrooms

From definition to identification and subsequent classroom planning, teachers are involved in accommodating the cognitive and affective needs of gifted students. The philosophy underpinning New Zealand's gifted and talented education policy is that gifted students can be found in all schools and classrooms and therefore it is important to provide these students with an "education matched to their individual learning needs" (McDonough, 2005, p. 36) through a curriculum expanded in breadth and pace to meet respective learning needs. *Gifted and Talented Students Meeting Their Needs in New Zealand Schools* (Ministry of Education, 2000) states that the "failure to recognise and meet the needs of the gifted and talented can result in their boredom, frustration, mediocrity, and even hostility" (p. 6) with research showing that few regular classrooms actually address the unique characteristics and academic needs of gifted students (Bourne & Sturgess, 2006; Hall, 2003; Riley & Bicknell, 2005).

The 'one size fits all' approach to teaching gifted students, popular in many schools, will not be successful simply because the inherent differences between gifted students suggest a unique solution is needed. Fundamental then, to providing educational opportunities for gifted learners, is that teachers will need to be supported by ongoing high quality professional teacher education (McDonough & Rutherford, 2004) so they can understand giftedness and put in place effective educational provisions. In 1999, Bourne conducted a case study of ten New Zealand primary schools with existing school-wide programmes in place to cater for gifted students. Her research concluded that while provisions such as acceleration, ability grouping, and withdrawal programmes can meet the educational needs of these students, a combination of various approaches used in a variety of ways should be employed and that "no one provision should stand alone" (p. 55). Bourne's research however, did not focus on the gifted learner in the classroom, but rather the way in which the school structured programmes. Additionally, the views of the gifted students were not elicited.

Findings from a research study conducted by Keen (2008) into gifted education in the Bay of Plenty, Otago, and Southland regions of New Zealand indicate a wide range of

strategies were used by early childhood centres, primary, and secondary schools to cater for gifted students. These included:

- enrichment,
- competitions,
- withdrawal groups,
- acceleration for single or multiple subjects,
- individual study projects,
- streaming by ability,
- individualised education plans,
- cluster groups for interests,
- extra curricular clubs, and
- computer based virtual instruction.

Keen's study concluded primary schools were more likely to use a greater number of the strategies with enrichment being the most favoured response to meeting needs of gifted students. Cathcart (2005) states the uniqueness and diversity of gifted students means "no-one technique is going to satisfy all needs" (p. 31), strengthening the view that a flexible and comprehensive range of strategies, and a continuum of opportunities should be considered to engage gifted students in learning in their regular classroom settings (Ministry of Education, 2000). For example, combining enrichment and acceleration with a mix of school and outside programmes, including provision for appropriate grouping should be considered.

Contract research undertaken by Riley et al (2004) for the New Zealand Ministry of Education examined the *Extent, Nature, and Effectiveness of Planned Approaches in New Zealand Schools* in identifying and providing for gifted and talented students. Results from this research suggest that while schools have indicated they are defining, identifying, and programming for their gifted students, much of the programming involves extension or withdrawal groups. Another outcome of this research is teachers feel they could and should do more, but lack professional knowledge of giftedness and pedagogy to teach gifted students (Riley et al, 2004). Therefore, a lack of professional

development leaves teachers unable to implement the changes needed to provide effectively for this group of students.

The Role of the Teacher

While there has been a great deal of comment and discussion within New Zealand educational circles about implementing teaching and learning practices for gifted students, the reality is much of the burden for this falls on schools and ultimately to each classroom teacher. The expectation from the teacher is they will maximize all learning opportunities to enable the potential of gifted students to be realised (Baldwin, Vialle & Clarke, 2000; Pohl, 2005). A key consideration however, of accommodating the needs of gifted students, is the shared responsibility of teachers along with parents and caregivers, the wider school community, and the gifted student themselves. For most New Zealand primary school teachers, however, providing for gifted students is a matter of utilising whatever strategies and resources can be mustered as they are left to unilaterally make decisions about how best to meet a gifted student's learning needs.

At the core of the New Zealand Government's Gifted and Talented Education Policy is the teacher who provides and "contributes to positive learning outcomes for all students" (McDonough, 2004, p. 35). Therefore, the classroom teacher is the key to the educational development of all students, however unprepared and inexperienced they may be in meeting the cognitive and affective needs of their gifted students (McGrail, 1998). Riley et al (2004) concluded that 82% of New Zealand schools provide for their gifted and talented students within the regular classroom chiefly because the flexibility of the New Zealand Curriculum allows teachers to differentiate their learning and teaching programmes. Gifted students are therefore reliant on the expertise their classroom teacher may have in understanding and providing effectively for them. This highlights another concern, previously mentioned, that professional development in gifted education is needed for all New Zealand classroom teachers.

In a comprehensive study of New Zealand schools Alton-Lee (2003) identified quality teaching as a key influence on high quality outcomes for diverse students. Her study determined there were ten characteristics of quality teaching linked to student outcomes including:

- focusing on student achievement with appropriate expectations,
- teaching being responsive to diverse learners, and
- curriculum goals and resources should optimise critical thinking with an emphasis on student achievement and learning.

While this was not a direct study of gifted students, it does give a New Zealand context in which to review what constitutes quality teaching. Evidence from Alton–Lee's study does suggest the challenge for teachers is to manage the learning needs of diverse students. In this way the diversity and uniqueness of gifted students provides New Zealand classroom teachers with a clear and present challenge.

It is also important for teachers of gifted students to know how gifted students differ from their classmates, how they differ from other gifted students, and how these learning differences can be accommodated (Mills, 2003; Johnsen, Haensly, Ryser, & Ford, 2002). Vialle and Quigley (2002) found the characteristics of effective teachers of gifted students could be grouped around three broad themes; the teachers' knowledge and skills, the teaching and classroom management style, and interpersonal qualities. Teachers' knowledge and skills include having insights into the cognitive and affective needs of gifted students as well as being able to utilise different instructional strategies such as the timely assessment of student achievement. A teachers' classroom management style influences the flexibility the teacher shows towards providing student-centred learning opportunities.

Other characteristics identified by Vialle and Quigley (2002) that make teachers effective when teaching gifted students in the classroom include:

- having the skills to differentiate the curriculum,
- employing strategies to encourage higher level thinking,

- encouraging students to be independent learners,
- acting as a facilitator or 'guide on the side',
- creating a non threatening learning environment,
- being well organized,
- possessing in-depth knowledge of subject matter,
- thinking creatively,
- possessing excellent communication skills, and
- possessing a sense of humor.

Teachers of gifted students therefore should be well trained and experienced in supporting the cognitive and affective needs of gifted learners by possessing a high tolerance of ambiguity, flexibility and passion about what and how they teach (Hall, 2001; Rowley, 2004; Valpied, 2005). Gifted students also benefit from teachers who have high expectations of their students (Hargrove, 2003). For example, the teacher who believes they have 'no gifted students' in their classroom' may not be creating the classroom climate needed to support giftedness. Conversely, expecting correct answers and 'school smart' behaviour to be a sign of giftedness may disadvantage the gifted student who does not conform to these classroom expectations. What is of greatest benefit to gifted students is having their specific learning needs met, not necessarily with more attention or better resources, but with teachers who are proficient at meeting their diverse learning needs.

Classroom Provisions and Instructional Strategies

McGee (2001) records when we view inside classrooms we notice many have aspects in common, however, when the "students and teachers arrive; each classroom is transformed into a unique place" (p. 12). The classroom is where curriculum documents come to life and where teachers constantly try to fit curriculum knowledge, pedagogical knowledge, and their students' diverse learning needs together. Beresford (2005) suggests important to providing effectively for gifted students is to ask them and listen to what they identify as their learning needs. From this teachers can determine and then construct

the processes of learning and provide opportunities for student involvement, including culturally appropriate learning experiences.

Hargrove (2005) outlines strategies enabling good teaching and learning to occur for gifted students in their regular classrooms. These include an environment in which critical thinking, making decisions, defending choices, reasoning from evidence, and accepting ongoing feedback from teachers is promoted. She uses the analogy of a personal trainer who needs to assess the client's readiness to undertake physical activities. This is achieved by showing and telling them how to do unfamiliar exercises and demonstrating how and where to improve. In the classroom this strategy would engage gifted students in understanding that learning sometimes takes time and "mastery and growth requires effort" (p. 30).

Algozzine and Ysseldyke (2006), Forster (2006), and Van Tassel-Baska (1989) identify classroom practices and teaching strategies they consider to be effective for gifted students to include:

- setting individual learning goals by varying the pace, type, and number of activities,
- employing grouping practices,
- utilising higher order thinking,
- considering prior knowledge through pre-testing,
- providing opportunities to be creative,
- exposing gifted students to creative thinking skills,
- challenging students through discussion,
- modifying content and varying resources,
- opportunities for independent research,
- compacting the curriculum, and
- creating opportunities to make interdisciplinary connections.

Slavin (1996) also suggests instruction is only effective when it is of high quality and appropriately matched to students' levels through meaningful assessment. He considers assessment should have clear criteria, be an integral part of the teaching programme, be

open-ended to allow different levels of achievement to be demonstrated, and involve the students in rubric construction and success criteria. For gifted students, assessment could identify specific gaps in a student's knowledge so these may be taught quickly to allow the student to progress. In this way, learning experiences can be tailored to the gifted student's individual abilities, interests, and the ways in which they like to learn.

Gifted students should also be taught basic skills as quickly as possible with an emphasis on cognitive dimensions, involving the higher level thinking skills of analysis, synthesis, and evaluation as well as affective dimensions in discussion and expression of feelings (Gallagher, 2000; Rowley, 2004). Gifted students should also be provided with specific expectations about the outcomes of their learning; the products they are expected to generate, and be given opportunities to deal with real world problems and issues (Rash & Miller, 2000). Classroom teachers should also endeavour to provide learning experiences that encompass novelty because brain research has shown, that among other things, the brain responds to novelty and the unexpected (Clark, 2008; Hargrove, 2005; Hunt, Kaplan & Barkett, 1994). In much the same way that a personal trainer might inject fun and excitement into a client's physical workout, so too can a teacher make learning fun and exciting for gifted and all students (Hargrove, 2005).

Instructional strategies in the classroom should also involve challenge and choice. Gentry, Rizza and Owen's (2002) research into perceptions of challenge and choice in classrooms found what teachers say they do and what students experience in the classroom may be reported differently. For a gifted student, challenge may be in the subject or interest at which they excel so challenge should not always be seen from the teachers' perspective or from a deficit perspective (Hall, 2003). Caine and Caine (2001) suggest learning takes place when the level of challenge stimulates the learner's abilities and interests and presents learning experiences differing in complexity. Important too, is what constitutes challenge for one gifted student may not be challenging for another gifted student as challenge changes as the context for learning changes.

As Tomlinson and Doubet (2006) record there is "no one instructional strategy that belongs to gifted students" (p. 84) and therefore many strategies should be utilised to cater effectively for gifted students. Strategies include the development of learning centres, problem-based learning, compacting the curriculum, and using open-ended questioning. Learning centres can be based on curriculum topics or from student interests and should address gifted students' learning styles as well as challenging them with a variety of advanced materials and activities as well as providing them with opportunities for self-directed learning and decision-making (Tomlinson, 1999). However, it should be noted not all gifted students will have the skills necessary to be successful at this type of independent learning and those without skills will need to have them taught.

Open ended questioning provides a way for gifted students to move beyond basic questions and answers and develop analysing, synthesising and evaluating skills. By utilising questioning strategies teachers can determine a gifted student's prior learning as questioning can often elicit an understanding of the curricula beyond same-aged peers (Van Tassel-Baska, 2003). Another successful way to cater for gifted students is through curriculum compacting which is defined as a "procedure used to streamline the regular curriculum for students who are capable of mastering it at a faster pace" (Reis, Burns, & Renzulli, 1992, p. 5). This provides teachers with a structured approach to assessing a student's knowledge and skills. Reis, Burns and Renzulli (1992) outline three steps to curriculum compacting, firstly pre-assessment to determine the extent of the knowledge and skills of an upcoming unit of study, establishing the goals to be achieved, and thirdly planning a unit of work at the appropriate level. In this way the specific learning needs of the gifted student are identified and learning becomes focused on those areas of the curriculum yet to be mastered.

Another instructional strategy successful with gifted students is to present them with real life situations and problems. This is called problem based learning which provides gifted students with choice and control about what to work on, how to work, and what products to generate as well as placing responsibility on the student for finding information and monitoring their own understanding (Gallagher, 2005; Van Tassel-Baska, 2003). From

the instructional strategies and classroom practices outlined above it is evident that flexibility and challenge are important considerations in providing for gifted students. Maker and Schiever (2005) suggest however, an appropriate classroom programme for gifted students should be 'qualitatively different' from the programmes for other students and a way to achieve this is through differentiation.

Differentiation

Teaching gifted students and catering for their identified learning needs as well as providing opportunities for the potential of gifted students to develop is enhanced through the use of differentiation. Bourne and Sturgess (2006) and McDonough, (2004) suggest a strength of New Zealand's approach to gifted education is the "commitment to the regular classroom as the predominant site in which the learning needs of gifted students should be met" (McDonough, 2004, p. 38). However, as Cathcart (2005) points out it is the teacher of the regular classroom who may be tasked with providing a differentiated programme for gifted students and it is evident from overseas studies such as Archambault et al (1993) and Whitton (1997, cited in Cathcart, 2006) that the differentiation of programmes is totally dependent on the capability, enthusiasm and readiness of teachers to provide for gifted students in this way. The reality is New Zealand teachers may not yet have acquired the necessary skills or understandings for this provision to consistently and successfully occur in the classroom environment.

The successful implementation of differentiated learning programmes becomes reliant on teachers' knowledge not only of the specific learning needs of gifted students but also of the implementation of differentiation as a strategy to meet these needs. Not every gifted child, for example, needs acceleration, or to be grouped with other gifted students. In particular, in a classroom, differentiation should promote learning for gifted students that:

- demands excellence,
- fosters creativity,
- requires critical thinking,
- poses 'real' problems,
- promotes self-directed learning,

- permits individual pacing,
- rewards risk-taking, and
- allows 'dreaming'.

(McGrail, 1998; Mulhern, 2003)

A 'normal' classroom curriculum can be too repetitive or have little depth and challenge for gifted students, whereas a differentiated curriculum can better accommodate students' learning needs. Differentiation gives teachers the tools to be able to vary the curriculum and instruction. Diffentiation can mean:

- increasing the level of abstractness and complexity,
- allowing for different learning rates, styles, interests, and abilities,
- creating time for enrichment or exposure to more advanced learning experiences,
- enrichment or acceleration with a focus on thinking skills, abstract concepts advanced content, interdisciplinary studies, and
- blending of content, ideas, problems or themes in greater depth and breadth.

(Clark, 2008; Maker and Nielson, 1996; Matthews & Foster, 2005; Winebrenner, 2000)

Tomlinson (1995) defines differentiation simply as 'shaking up' what goes on in the classroom so students have multiple options for receiving information, making sense of ideas, and expressing what they learn. Differentiation allows for flexible grouping whether formed by students or by the teacher, for specific skills instruction with students working independently or working as a pair, and for students to move in and out of groups according to need. Tomlinson (1995) records the "primary intent of differentiation is to maximize student capacity" (p. 13) with the teachers' role to organise learning opportunities. The teacher can achieve differentiation in the classroom by using challenging material, blending whole class, group and individual instruction, assessing a student's readiness in a variety of ways, and by responding to the dynamic needs of their gifted students (Maker & Nielson, 1996; Tomlinson, 1995; Winebrenner, 2000).

Tomlinson (1999) also records differentiation to include modifying the content, process, product, and learning environment. To differentiate the content involves altering the

information, concepts or skills a student has to learn. Differentiating processes encompasses changing the ways in which students manipulate the content or practice the skills and differentiating products gives students alternative ways to demonstrate understanding. Differentiating the learning environment can be achieved within the classroom, for example, grouping in different ways or by offering alternatives to the classroom setting. Differentiation might also involve learning centres, tiered activities, learning contracts, and critical and creative thinking activities (Johnson, 2001).

Integral to the success of differentiation is the "ongoing assessment of student needs" (Tomlinson, 2004, p. 188). Feldhusen, Van Winkle and Elhe (1996) record assessment to be the key to effective teaching as it allows each student's mastery to be monitored. They suggest students have a right to learn new material even when new content may be prepared for older students as "educational programs must respond to the abilities and readiness of individual students" (p. 13). At its best then, differentiated instruction ensures the 'what and how' a student learns and 'how they demonstrate what they have learned' is matched to their readiness to learn, their interests, and the way they like to learn.

As Hunt et al (1994) comment, creating opportunities for differentiation requires knowledge of the students, selection of the strategy for differentiation, and selection of an appropriate instructional approach. Van Tassel-Baska and Stamburg (2005) suggest while differentiation is a 'critical aspect' of planning curricula for gifted learners barriers to teacher's being able to differentiate the curriculum often include the degree of differentiation required, the attitudes and beliefs of teachers about gifted learners, a lack of understanding about providing for gifted students, and most importantly a lack of support for teachers to implement provisions for gifted students.

Solutions to these barriers include modulating expectations for gifted students, creating flexibility within the regular classroom related to the content students study, and access to professional development in gifted education for teachers. However, as Parke (2003) suggests it is a 'great mistake' to look to only one provision for gifted students and it

would be wise to look at multiple programming approaches. A teacher's predominant role therefore varies according to the needs of the students and can include being a facilitator, a mentor, or an orchestrator of differentiated programmes to ensure balanced educational opportunities are provided. The "challenge for teachers is to manage such a multiplicity of opportunity" (Hill, 2005, p. 43) and to be able to manage opportunity within different curriculum areas such as mathematics and literacy.

Mathematically Gifted Students

Krutetskii (1976) studied mathematically gifted students over a period of 12 years and concluded gifted mathematicians cannot be defined merely by the speed at which they make computations or how well they remember and recall formulas. Instead, gifted mathematicians can be defined by a "structure of abilities that constitutes the quality of mind known as mathematical giftedness" (Usiskin, 1999, p. 58). This structure of abilities encompasses obtaining mathematical information, processing mathematical information, retaining mathematical information, and possessing a mathematical mind or having 'mathematical insight' (Krutetskii, 1976, pp. 350-351).

Usiskin (1999) suggests that Krutetskii's 'qualities' of mathematical giftedness are inherent and developed over time through exposure to mathematical ideas and processes. This implies mathematical ability needs to be nurtured in the classroom environment and may not be readily apparent in the classroom. To develop a gifted student's mathematical ability they first must be identified. In the school environment this could be achieved through utilising a range of tools from observation, portfolios, standardised testing, problem-solving activities, and questioning. As Usiskin (1999) theorises "mathematical ability is a multi-dimensional entity not able to be captured in a single number" (p. 60) therefore in the classroom setting the characteristics and traits of mathematical giftedness may be manifested in diverse ways including:

- the ability to grasp mathematical concepts and strategies quickly with good retention,
- an unusual curiosity about numbers,
- an awareness of patterns,

- the ability to think abstractedly,
- the use of flexible and creative thinking strategies and solutions,
- the ability to transfer mathematical concepts and processes to new and unfamiliar situations,
- persistence in solving difficult and complex problems, and
- a tendency to 'see' the world through a mathematical perspective.

(Algozzine &Ysseldyke, 2006; Heid, 1983; Koshy, 2002)

Gifted mathematicians also enjoy exploring patterns and puzzles, viewing mathematical structures in a variety of situations, recognising, creating, and extending patterns, and organising and categorising information (Algozzine &Ysseldyke, 2006). As problem solvers, gifted mathematicians may often take unexpected shortcuts and show flexibility when searching for solutions (Koshy, 2002; Souza, 2003). However, gifted mathematicians may also hide their abilities while others may not yet be challenged in their classrooms so no-one realises their mathematical ability. As noted by Usiskin (1999), giftedness in mathematics is developed over time and when opportunities to practice mathematical ideas transform mathematical 'promise' into mathematical talent.

The New Zealand Mathematics Curriculum states one of its aims is to help students to develop a belief in the value of mathematics and to nurture confidence in mathematical ability as well as fostering 'mathematical talent' (Ministry of Education, 1992). Mathematics in the New Zealand Curriculum (1992) also specifically mentions gifted students recording "exceptional ability in mathematics must be extended" (p. 12) but does not outline specific strategies to achieve this. The NZCF "advocates flexibility and individualisation, but it is questionable whether our classrooms adequately provide for the needs of gifted and talented students" (Ministry of Education, 2000. p. 126). Teaching gifted mathematicians in New Zealand primary school classrooms may be inadequate largely because misunderstandings in defining giftedness in mathematics or a poor understanding of the exact depth, flexibility, and broadness of the curricula needed to provide programmes where students can pursue mathematical topics independently.

Teaching Strategies for Mathematically Gifted Students

As Stanley (1996) suggests it is not just enough for teachers to be able to identify and describe the characteristics of gifted mathematicians. Teachers need to be able to develop educational interventions that are fast paced, flexible, and responsive to identified learning needs and which encourage gifted mathematicians to use their 'mathematical minds'. Therefore, a mathematics curriculum for gifted students should have content at greater depth and at higher levels of complexity than same-aged peers are expected to cover; encompass a discovery approach with a focus on problem-solving and open-ended questions, allow opportunities for interdisciplinary connections to be made, and give time to engage in mathematical problem-solving and the generation of problems and ideas (Heid, 1983; Johnson, 2000).

For the most part New Zealand's gifted mathematicians learn in their regular classrooms but to meet their learning needs teachers are required to provide high levels of mathematical thinking. To develop gifted students interests and expertise in mathematics programmes should offer enrichment, acceleration, or a combination of both of these approaches (Koshy, 2002). Van Tassel-Baska (2003) suggests in-depth study of the history of mathematical ideas and real-world mathematical connections promotes curiosity about mathematical ideas. This alongside solving complex and open ended problems and making connections with other disciplines can provide the basis for a mathematics programme within the classroom to cater gifted mathematicians (Johnson, 1993, cited in Stepanek, 1999).

New Zealand teachers are most likely to provide for their gifted students using any or all of the following provisions; withdrawal groups, cluster grouping, ability grouping, mentoring, and differentiation (Ministry of Education, 1996). Tomlinson (1995), and Lupkowski and Assouline (1992) record differentiation in mathematics allows for individual differences and for the planning and presentation of mathematical ideas and materials to meet individual levels of understanding. Ability grouping based on common strategy stages allows students to work at their own level and individual work allows for the practice of key skills. The Ministry of Education (1996; 2007) suggests that New

Zealand teachers can cater for students of differing abilities by posing problems that have many 'solution paths', or through providing variations on the same task, making activities creative, or through different grouping strategies.

Teachers therefore have many tools at their disposal to differentiate the mathematics curriculum including using strategies such as establishing the extent of a gifted student's mathematical knowledge, offering them challenging activities, and providing them with opportunities for both independent and group activities. These strategies have been also identified as ways for teachers to promote and foster curiosity and enthusiasm in mathematics (Johnson, 2000; Tomlinson & Dockterman, 2002; Wieczerkowski, Cropley and Prado, 2000).

Other teaching strategies which are effective in developing the knowledge and skills of gifted students and which are helpful in determining the best teaching strategies for gifted mathematicians include:

- flexible expectations by the teacher,
- inquiry based learning and discovery approaches,
- posing open ended problems with multiple solutions,
- accepting there may be multiple ways to find solutions,
- higher level questioning -what if or why, and
- providing opportunities to work with like-minded peers at a fast pace and increased depth.

(Sheffield, 2003; Souza, 2003; Stepanek, 1999; Van Tassel-Baska, 2003)

However, none of these strategies are important unless the teacher is aware of the specific learning needs and behaviours of the gifted mathematician and a critical component of a teacher's role is to assess skills already mastered and those skills and curriculum content yet to be mastered.

Gifted in Literacy

Literacy is defined as the "ability to understand, respond to, and use those forms of language that are required by society and valued by individuals and communities" (Ministry of Education, 2006, p. 18). A student gifted in literacy may possess a voracious appetite for books, show an awareness of language and language structures beyond same aged peers, and process information and thoughts at an accelerated pace. They may also display other characteristics and behaviours such as:

- reading incessantly,
- reading at deductive or inferential level,
- automatically integrating prior knowledge and experience,
- perceiving unusual relationships,
- grasping complex ideas and nuances,
- using higher order thinking skills,
- synthesising ideas in a comprehensive way,
- demonstrating a creative flair in writing,
- using poetic expression,
- experimenting with words, and
- possessing communication skills which keep audience attention.

(Ministry of Education, 2006; Gross, 1994; Moore, 2005; Souza, 2003)

Not all students gifted in literacy will display all of these characteristics nor will they possess these characteristics to the same degree of intensity. Development in one of the areas of reading, writing, listening, and speaking may be more pronounced than in the others, for instance a high verbal ability or a reading ability asynchronous with same-aged peers. This reflects once again the uniqueness of gifted students and the variation in abilities found amongst these students. Further, as Gross (1994) states it is important to note gifted students are not all advanced readers and all advanced readers are not necessarily gifted.

However, gifted readers generally read more than two years above their same-aged peers and for some gifted children they would rather read than do anything else. They display a huge capacity for language and often possess a precocious sense of humour. Moore (2005) defines gifted readers as those students who have longer attention spans than their classmates, retain vast quantities of information, and use more effective reading strategies than other students. Many gifted students already know how to read before they arrive in the school classroom as the gifted reader is often self-taught (Gross, 1994).

Levande (1999) also describes gifted readers as those who have an exceptional ability to read and work with text information and their advanced language abilities means they may use words easily, accurately, and creatively in new contexts especially in writing genres. Levande also suggests language ability mirrors cognitive ability therefore the cognitive abilities of gifted readers differ from the norm. Clark (2008) outlines that the cognitive needs of gifted students can be developed by being:

- exposed to new and challenging information,
- exposed to varied subjects,
- allowed to pursue ideas and interests as far as they want to,
- exposed to ideas at rates aligned with their pace of learning, and
- able to pursue inquires beyond an allotted timeframe in the classroom setting.

While many gifted students are fluent speakers and independent readers and writers, they still however require deliberate teaching so that they can be effective users of new literacy practices and technologies (Ministry of Education, 2006). Therefore, to meet such needs teachers have to be cognisant of the instructional strategies which provide challenging literacy activities in the regular classroom setting.

Instructional Strategies for Gifted in Literacy

Teachers must be able to recognise the knowledge each student already has and build on this knowledge base. The implication for teachers is to recognise that acquiring literacy skills is developmental and that social and cultural practices shape literacy learning (Ministry of Education, 2006). This means students may take different pathways in their

literacy learning highlighting the diversity of student needs. Effective literacy teaching for all students has been identified as encompassing:

- knowledge of the learner,
- expectations of students,
- activating prior knowledge,
- setting and sharing learning goals,
- engaging the learner with texts,
- selecting instructional strategies,
- teaching ways of comprehending and thinking critically,
- modeling processes used by effective readers and writers, and
- providing feedback.

(Ministry of Education, 2006; Olszewski-Kubilius & Whalen, 2000)

The Ministry of Education (2006) describe instructional strategies as the 'tools of effective practice' and the teacher is pivotal in employing strategies such as modeling, prompting, questioning, giving feedback, and explaining, with any or all of these being integrated at any one time. Therefore strategic teaching is seen as successful in developing and extending any learner's literacy and as gifted students are diverse learners their giftedness impacts on their learning needs as well as the way in which they receive instruction from teachers. Classroom management of any literacy programme includes whole and small group teaching with planning to teach based on assessment of individual student's strengths and deficits in learning needs. Teachers also consider motivation, confidence, and interests of the students and it is from this information the needs of gifted students can be considered and potentially met within the regular classroom setting.

However, in reading, gifted students need less practice with basic word skills and need challenging materials and instruction to facilitate critical and creative reading skills. The following practices that support reading and writing skills have been identified by Van Tassel-Baska (2003) and Forster (2006) to include:

- a wide range of reading material,
- activities to develop and practice critical reading skills,

- word development of synonyms, antonyms, metaphors, and analogies,
- promoting persuasive speaking or debate,
- opportunities to learn about the history of language,
- opportunities to talk about the texts they encounter,
- being immersed in poetry and having the opportunity to write poetry,
- experimenting with dramatic performances, and
- being presented with challenging activities along with advanced texts.

Assessment is used to assist teachers to set instructional objectives and learning goals for students. For gifted students it is important that a teacher uses a variety of assessments to identify the student's current expertise, to determine what learning has taken place, and to plan further learning. A powerful strategy is to "share assessment with students so that they are appraised of their progress and the work required from them to progress to the next step" (Ministry of Education, 2006, p. 8). There are many assessment tools for reading available to teachers in New Zealand schools including standardised testing, use of questioning, collecting student products, and setting success criteria.

Besides providing a balanced programme of learning for gifted students, teachers also need to create opportunities for the students to develop critical and creative thinking and to be able to embed "higher order skills into context" (Van Tassel-Baska, Zuo, Avery, & Little, 2002, p.33). Gifted students therefore need to be able to explore and write in a range of genres, to compare texts within and across different genres, and to be exposed to the ways in which professional writers think, plan, and make language choices. The role the classroom teacher plays in providing these opportunities is the predominant factor in the quality of the instruction received by gifted students in their regular classroom setting.

Summary

Gifted students need to be identified, nurtured, educated, and encouraged to develop their learning potential through matching individual learning needs to learning experiences (Kanevsky, 1995; Rowley, 2004). This can be achieved in the classroom when there is an

openness and respect between parents and caregivers, teachers and students, and where the curriculum is flexible and whole class teaching is minimal. Gifted students should be actively participating in decision-making, self-directed learning, and inquiry. Teachers are required to provide authentic assessment for their ongoing use to plan and use teaching strategies and to provide feedback to students (Pohl, 2005).

Fiedler, Lange, and Winebrenner (1993) suggest education is not about making sure all students have the same experiences but rather education for gifted students should afford them an equal opportunity to have their potential realised. In the ways that gifted students are similar to each other, their classroom experiences should be similar, but in the ways and the extent to which gifted students are different then what they experience in the classroom should be different. Pyryt and Bosetti (2006) record that provisions for gifted students can be summed up in five ways; pace, process, passion, product, and peers with these five factors representing the foundation for regular classroom provisions for gifted students.

Gifted students have diverse and unique characteristics. In New Zealand primary schools, gifted students spend most of their school day in a classroom environment with one teacher and their same aged peers. In this situation it is vitally important for the teacher to be able to recognise and provide for the gifted student's learning needs and Riley et al (2004) determined research is needed to 'bridge the gap between theory and practice' in New Zealand classrooms. However, because research is not conclusive about what works best for gifted students, teachers need to be able to experiment with methods to determine for themselves how well they meet the needs of their respective gifted students.

Teachers also need a repertoire of skills to teach effectively and these skills should be developed from research and theory about what constitutes 'good teaching and learning' for gifted students. What is known is that gifted students learn differently and at a pace more rapid and more in depth that their same aged peers. Accordingly, they need to be provided with opportunities to understand the ways ideas are connected, demonstrate the learning method that works best for them, and be challenged by new ideas presented at a

fast pace. Therefore, instructional strategies used by teachers in classrooms need to encompass differentiation of content and processes which present new learning to gifted students and provide opportunities for them to work with like-minded peers.

From the literature reviewed in this chapter it is apparent there is little specific research in New Zealand of gifted students' learning in regular primary school classrooms. Because of this limited knowledge base, the interactions between teachers and gifted students and the gifted students' responses to teaching strategies require study. If the principle learning context for New Zealand primary schools remains as 'one teacher, one classroom, same-aged students, for one year' then what happens to gifted students in this educational context is of paramount importance. This research provides insight into the methods available for a teacher to cater for a gifted student's needs by identifying effective classroom practices and strategies already being implemented in New Zealand primary school classrooms during mathematics and literacy teaching and learning.

Chapter Three

Methodology

Introduction

Two research approaches are available to investigate teaching and learning in a classroom setting; quantitative or qualitative research. While quantitative research relies on the observed effects of controlled and manipulated variables based on a hypothesis about what is expected to happen (Salkind, 2005), qualitative research seeks to describe the actions and behaviours of entities within their own naturalistic setting (Stake, 1995). To determine how teachers teach in their classrooms would be difficult to assess in a controlled quantitative environment and the manipulation of variables and the effects of researcher expectation could impact on the knowledge that is determined. Another drawback to quantitative research is the inherent difficulty in defining constructs, for example constructs of 'differentiation' or 'giftedness' could become potential sources of data contamination reducing the validity of any research outcomes. For these reasons, I determined that a qualitative research approach would be used to answer the questions posed in this research.

The Research Method: A Case Study Approach

Of the many choices in qualitative research I chose the case study methodology as the means through which data would be gathered and analysed to answer the research question: 'what strategies do New Zealand primary school teachers use in their classrooms (Years 4-6) to provide teaching and learning experiences in mathematics and literacy that cater for the identified needs of a gifted student?' Data was gathered from the interviews of three teachers and twelve gifted students as well as from observations of

the interactions between the participants during mathematics and literacy sessions in the classroom setting. In this way the case study was 'naturalistic', allowing the researcher to be involved in the context where the events and behaviours under study naturally occur (Bodgen & Bilken, 2003; Gillham, 2000). Also as a 'bounded system' (Stake, 1995; Merriam, 1998) the focus for any study becomes a "unit of human activity embedded in the real world" (Gillham, 2000, p.1). The way in which the participants interacted was the human activity embedded within the classroom environment and this activity was the source of rich descriptive data about the behaviours observed in the classrooms. In turn the data gathered from the interviews was analysed and offered an explanation as to why an entity acts as it does.

Stake (1995) also suggests a case study can be intrinsic; when a particular case is given to a researcher, or instrumental; when a researcher intends to gain insight into a research question to create knowledge and understanding about behaviours in particular settings. An instrumental case study best suits the purpose of the research for this thesis as it seeks to understand the interactions between gifted students and their teachers in the regular classroom setting. In selecting the methodology to use in qualitative research, choices must be made as to the cases to study, the data collection methods to employ, and the data analysis techniques to use (Cresswell, 2002). The steps I took in this decision-making process are outlined in Table 3.1. I also had to consider:

- where and how to conduct the case study,
- how to access and select the teacher and student participants,
- the focus for the observation of the mathematics and literacy sessions,
- ethical issues and gaining informed consent,
- interview questions for teacher interviews,
- questions for student interviews,
- the timeframe for the research,
- the length of time for the observations and interviews, and
- the time it would take to analyse the data and write the thesis.

Table 3.1 Steps in the case study approach

Step One: Accessing the participants	Choosing the case study site Selecting teacher participants Identifying gifted students
Step Two: Gaining informed consent	Managing ethical considerations Establishing rapport with teachers
Step Three: Establishing interview and observation timetables	
Step Four: Interview of classroom teacher	Classroom One
Step Five: Classroom One Observations	Establish researcher presence Observe five mathematics lessons Observe five literacy lessons
Step Six: Student interviews	Classroom One Formulate interview questions Interview students
Step Seven: Interview of classroom teacher	Classroom Two
Step Eight: Classroom Two Observations	Establish researcher presence Observe five mathematics lessons Observe five literacy lessons
Step Nine: Student interviews	Classroom Two Formulate interview questions Interview students
Step Ten: Interview of classroom teacher	Classroom Three
Step Eleven: Classroom Three Observations	Establish researcher presence Observe five mathematics lessons Observe five literacy lessons
Step Twelve: Student interviews	Classroom Three Formulate interview questions Interview students
Step Thirteen: Data analysis and thesis writing	

A case study can also provide answers to research questions framed with 'what' and 'how' (Cresswell, 2002) and in this research key supporting questions were composed in this way including what do teachers need to 'know' about gifted students so they can identify strategies to use to meet a student's needs?; how do teachers plan and utilise strategies for gifted students? and how do teachers evaluate the effectiveness of the strategies they use to specifically target gifted students learning experiences? Therefore, within a qualitative framework such as a case study, observations and interviews provide the means to access the perspectives of the participants and observe their interactions. For this particular study a Classroom Observation Focus (Appendix 1) was developed and used to collect data. This afforded me, as the researcher, insight into the interactions between the gifted students, the teachers and the gifted students, the gifted students and their classmates as well as the instructional strategies I could expect to see.

However, as Freeman (1998) records there are difficulties in using the case study approach to research educational issues because while the case study can provide descriptions of human activity in order to be "effective and rigorous it has to be set in a wider social context to justify generalisations" (p. 20). Thomas (2003) concurs, stating generalisations drawn from one case study could be applied to other cases causing errors and misunderstandings. For instance, readers could use the outcomes of a particular investigation to help them understand other situations when the case has not identified likenesses, differences, or generalisations to be drawn.

In this way assumptions about gifted students may occur, if as a group, gifted students are compared with research findings based on small or unrepresentative samples. The research findings reported within this thesis acknowledge and address the concerns outlined by Freeman (1998). Observing and interviewing twelve gifted students in three different classroom settings gave a broad base from which to analyse data and make recommendations. Merriam (2002) also records a single case study is of little importance in itself, but it can have the potential to influence policy and practice. A research goal of this case study was to provide rich data to determine if the experiences of these gifted students and their teachers would describe similar experiences of teachers and gifted

students in other primary school classrooms. Another goal was to contribute to the understanding of the daily interactions between gifted students and their teachers during mathematics and literacy learning.

Classroom Observation Focus

A consideration for my research was that I would be observing interactions in two different curriculum areas. I needed to be aware that instructions and learning 'differ by content area' (Turner & Meyer, 2000) and consequently the design of a Classroom Observation Focus (Appendix 1) allowed me to observe each of the different curriculum areas and the instructional strategies pertinent to those areas. The instructional strategies targeted for observation included teacher actions such as planning and expectations for gifted learners as well as the differentiation of content, process, product, and learning environment. The gifted students' responses were recorded against these focus areas. While other classroom observation scales were available (Van Tassel-Baska, 2000; Westberg, 1997; 1995) they were not specific enough to be used for this research.

If instruments are to be used they must be reliable and valid in what they are measuring (Salkind, 2005) therefore the Classroom Observation Focus was developed by me from information gathered from research and literature on gifted education teaching practices as highlighted by Archambault et al (1993), Hill (2005), Moore (2005), Rowley (2004), Stepanek (1999), Tomlinson (2001; 2000; 1995), Van Tassel-Baska (2000), and Westberg (1995; 1997). The purpose of the classroom observation focus was to determine if instructional strategies for gifted students in a regular classroom setting could be expected to be appropriate methods of instruction for the teaching and learning of mathematics and literacy to gifted students.

Research Procedures

The remainder of this Chapter outlines the research procedures used in this case study including how the participants were accessed, the data collection procedures, and the data analysis processes. Also examined are issues and ethical concerns arising as a

consequence of using the case study methodology and I address problems specific to conducting this research.

Research Context -The School

The school used in this research is a decile 8 co-educational primary school located in a suburb of a lower North Island city in New Zealand. In 2007 the school had 262 students enrolled from different ethnic and cultural backgrounds including New Zealand /European Pakeha, Indian, Asian, Other European, Fijian, Cook Island, Māori, and Samoan. The school has a policy for 'gifted and talented' students encompassing multi-categorical definitions of giftedness and multi-method identification techniques.

Within the school, programmes in mathematics and literacy are seen as the foundation skills for all students and as the basis for further learning. Therefore, considerable emphasis is placed on these areas of the curriculum. The teaching and learning of literacy is based on meeting students' identified learning needs through lessons providing students with the knowledge and skills to competently and confidently speak, read, and write. In mathematics there is an emphasis on mathematical knowledge and strategies. The teaching focuses on developing the students' basic knowledge and understanding of numbers, basic facts, and fractions. The school is well resourced and the focus of Literacy and Numeracy professional development undertaken by the teaching staff in previous years has ensured teaching and learning resources and materials are readily available.

Research Timeframe

Initial contact was made with the Principal of the school in late in February 2007 and the collection of data ended in early November 2007. Communication with the school established the need to have sound identification tools to be able to identify gifted students and a staff development programme was undertaken by the school during terms One and Two, involving myself working with the whole school teaching staff to refine the school's procedures for identifying gifted students. This included implementing a student nomination form, a peer nomination form, and developing teacher checklists.

Collection of data began in Term Three. The observation and interview timetables took into consideration my own teaching commitments elsewhere, the participating teachers, classroom release times, and other events such as sports fixtures and speech competitions. Five observations of mathematics and five of literacy were undertaken in the three classroom settings. An outline of the timings of these observations is included in Appendix 2. Mathematics sessions all occurred between 9.30 am and 10.30 am and Literacy sessions between 11 am and 12.15 pm. Observation of the third classroom was delayed until Term Four because a change of teacher necessitated time for the new teacher to 'settle' into classroom routines. It should also be noted that the following aspects of the research were consistent in timing and procedure:

- each classroom teacher was interviewed prior to classroom observations commencing,
- student participants from each class were interviewed at the conclusion of the observations in their classrooms, and
- the Classroom Observation Focus was used for all classroom observations.

Teacher Participants

After meeting with the principal it was determined the senior syndicate teachers would support the research as they themselves were interested in examining their own teaching practices. The senior school syndicate consisted of three classes with 28 Year 4 and Year 5 students in one classroom and two classrooms of 29 Year 5 and Year 6 students. Once the research setting had been confirmed verbally, written consent was sought from the Principal, the Board of Trustees and the participating teachers themselves (Appendix 3). Information about the research was made available to the teachers concerned through a written information sheet noting they had the right to withdraw from the study at any stage (Appendix 4). The teachers portrayed in this research are not intended to be 'typical' or 'representative' of teachers in New Zealand primary schools, but the teaching experiences described in this research may increase the reader's ability to comprehend more fully these teachers' experiences.

The teaching experience of the participants was varied. One was a beginning teacher with eighteen months of long-term relief teaching; another, the Deputy Principal had eighteen years of teaching experience almost exclusively working with Years 6 to 8 students. The third teacher had been teaching for nine years, four of those teaching primary school students overseas. While these three teachers brought to the classroom different teaching experiences they shared a common philosophy as 'facilitators' and 'guides' of their students' learning. They individually expressed to me an interest in ensuring gifted students were presented with challenging opportunities in learning. None of the teachers had undertaken gifted education studies.

Student Participants

Gifted student participants were named by their teachers as possessing specific strengths in either mathematics or literacy or in both curriculum areas and consent to participate was sought from parents and caregivers and from the students themselves (Appendix 5). Sixteen students were initially identified through testing by educational psychologists and through using school wide multi-method identification processes. These included the results from standardised testing, Numeracy Project strategy testing, and teacher completed checklists. A full list of the identification processes used is available in Appendix 6. Student participants were also recognised by other teachers in the school as being 'gifted' and these observations came from their interactions with these students over time.

Only twelve of the sixteen gifted students originally identified were considered in the final research findings as two students returned consent forms after data collection began and two were absent for long periods during the data collection. The students ranged in age from eight to twelve and came from a variety of cultural and ethnic backgrounds including Fijian, Indian, Māori, and New Zealand European Pakeha. One student had been assessed by an educational psychologist to have an IQ of 160 +, with other students excelling in classroom testing and standardised testing which showed they were capable of achieving at levels well beyond that expected for their age group. Other student

participants were identified through portfolios of student products collected since the beginning of their schooling.

My Role as the Researcher

In the process of acquiring information the researcher should let the participants know who they are, what they are doing, why the research is being conducted, and what will be done with the results (Stake, 1995). For the purpose of this research my role was one of a data collector, data analyser, and report writer. It was my responsibility to think through the aspects of the research and determine how and from where the data could be collected. By utilising a variety of data collection methods I achieved a coherent understanding of the participants and their interactions with each other in the classroom setting thereby increasing the validity and credibility of the findings. I assured the teacher participants the purpose of the research was not to judge or evaluate but rather to gain an understanding of the strategies they used to provide for gifted students in their classrooms during mathematics and literacy. Efforts were made to make my presence in the classroom as seamless as possible by my visiting the school regularly and being present at school events.

Thomas (2003) records that remoteness "increases the probability that people in the episode will act in their typical fashion" (p. 78) but in this case study there were distinct advantages in knowing the participants. For instance, background knowledge helped me to interpret some classroom events such as classroom management practices for particular students, and helped to create a collegial atmosphere when I was present for observations. Although this closeness could impact on the objectivity required for reliability and validity, I consider it to have contributed to a more accurate interpretation and representation of events. The major component for any researcher is to analyse and write a report on the research findings. My aim here is to inform and advocate for gifted education by ensuring all processes have been carefully and correctly documented thereby allowing for the findings to be clearly understood.

Data Collection

In this research, the data collection methods included classroom observations using the Classroom Observation Focus (Appendix 1). As the issue under study was the teaching strategies utilised during literacy and mathematics learning and how these catered for gifted students, both the teaching instruction and student responses were observed and recorded in conjunction with teacher and student interviews. The questions asked are outlined in Appendix 7 and Appendix 8 respectively. From these methods of data collection the 'voices' of the research participants could be 'heard', and the researcher could attempt to gain an understanding of the experiences of this particular group and their interactions in a particular context (Stake, 2005)

A 'passive participant' stance was adopted by me when observing the classroom events with no attempt to alter the patterns of interaction or the methods utilised by the teacher (Bogdan & Taylor, 1998). This allowed observations to include all the vagaries of classroom life including last minute and on-the-spot changes in implementation, as well as repetitive same day, same activity actions and events. In this way the 'naturalistic setting' of the case study was preserved. However, it is important to acknowledge people "tend to record as data what makes sense and intrigues them" (Compte, 2000, p.146). Therefore, it was significant for me as the researcher, to review how this selectivity affected the data collected and further, how the data collected affected the research conclusions.

Classroom Observations

Observation is the key tool in qualitative research because it allows the interaction of participants in particular contexts to be recorded. Thomas (2003) describes the act of gathering information by observation as watching or listening to events and recording what occurred in two ways; by taping and transcribing events or by note taking at the time of the observed events. The latter is referred to as 'direct observation' when the researcher immediately sees and hears what is happening with no special equipment being required. Disadvantages of this observation technique include a researcher's ability to keep an accurate record of what occurred as in any setting there are a myriad of

elements to distract the researcher. Watching the researcher take notes can also be of concern to some participants.

In this case study, I utilised a pre-observation session in each classroom to note the general classroom environment, to identify the gifted students by sight, to note classroom routines, and to establish a 'researcher presence'. Subsequent observations were to observe the teacher and gifted students during mathematics and literacy learning and teaching sessions. These observations took place over ten visits to each classroom, resulting in five observations for each curriculum area, using the Classroom Observation Focus (Appendix 1). One advantage of this 'direct observation' technique was that I could record what the participants were saying and how they were interacting as the sessions unfolded.

The first phase of the classroom observation (Sessions One and Two) established the strategies being used by the teachers. The second phase of the observations (Sessions Three, Four, and Five) were to record the effects of the instructional strategies on the targeted gifted students. It was apparent however keeping these phases distinct was difficult and resulted in concurrent observation of the teaching strategies and the students' behaviour to be able to record accurately the interactions between the two. All classroom observations began with the collection of data about the classroom, the number of students, the time of the observation, and the presence and purpose of any additional adults in the classroom.

Individual students were studied during each observation period but many times the gifted students were in the same groups. They were also observed in whole class interactions, in small groups, and when working with a partner. The interactions between the gifted students and their teachers were also noted. Documentation of what the teacher had planned and what actually happened were recorded as were samples of the student products and responses. Sometimes, either before or after classroom observations the teacher and myself conducted informal discussions involving changes to the timetable which might impact on subsequent visits, modifications that may have been made to the

planned lesson, as well as clarification of events or behaviours I may have noticed during the observation itself. All observation notes were written in full after each site visit and if appropriate, questions or queries were noted for clarification at the next site visit.

Interviews

Interviews can range on a continuum from structured to unstructured, with semi-structured interviews falling between these two techniques. Whereas structured interviews are based on specific questions being asked, usually by the researcher or interviewer, participants often lead the unstructured interview. A semi-structured interview builds into questioning the flexibility to capture insights and to explore participants and understand participant's personal beliefs, opinions, and perspectives (Connell, Lynch &Waring, 2002). The semi-structured interview is well suited to be led by the researcher and was the interview technique favoured for this research.

The importance of interviews is also recognised in qualitative research as both providing data and helping to construct meaning (Mertens, 2005). An interview therefore gives an individual's perspective and interpretation of events and behaviours occurring within the research setting. However sources of bias need to be considered when interviewing research participants. A potential source of bias may occur in interview responses because of the manner in which questions are phrased or verbal and non verbal interactions between the interviewer and interviewee. Mertens also suggests this bias can be eliminated by avoiding asking "why" questions which may be viewed as threatening to participants resulting in a defensive answer.

Interviews of Teachers

In this research an interview with the classroom teacher was conducted prior to the classroom observations. Each interview lasted approximately 90 minutes with open-ended questions organised around key themes informed by the literature on gifted education. The questions centred on the teacher's rationale for teaching, their role in providing for gifted students in mathematics and literacy, the strategies used in teaching in mathematics and literacy, and how these strategies were evaluated. A full list of the

teacher interview questions are listed in Appendix 7 and while the same questions were asked of each teacher, their individual responses often meant I probed for further information in varying directions. All three interviews were conducted at the school with one teacher asking for the interview questions prior to the interview. The teachers' responses to the questions were written by the researcher in note form during the interview and written up in full immediately after each interview.

As previously noted, semi-structured interviews were utilised in this research with the aim of guiding conversations with participants to provide insights into each teacher's interpretations of their teaching practices for gifted students (Turner & Meyer, 2000). McGee (2001) makes the point that it is very difficult for any researcher to be able to describe everything that goes on in a classroom so it becomes necessary for researchers to get teachers and students to be able to articulate the 'thinking' behind classroom interaction. As this case study progressed, the teacher participants began to verbalize more freely their feelings and opinions about what they were doing thereby ensuring the data collected accurately represented a clear picture of classroom interactions.

Student Interviews

The rationale behind conducting interviews with the student participants was influenced by Knight and Becker (2000) who suggest that the best way to discover if gifted students needs are being met is to ask them directly. In formulating questions Glesne and Peshkin (1992) state the questions asked by a researcher are the best they have before they have a chance to ask them. This means a researcher may have formulated questions to ask participants but the documents they collect or behaviours they observe may influence the types of questions the researcher subsequently poses. Also, the responses of the participants can lead the questioning in a different direction to that initially determined by the researcher. Therefore, new questions can be added as an interview progresses.

For this research, the questions for the student interviews were formulated after the observations and consequently could be tailored to meet the behaviours observed in the classroom. The full student interview questions are available in Appendix 8 and include:

- Do you feel challenged by the questions the teacher asks you in small group work?
- When the teacher asks you to work in groups for reading how does this match the way you like to learn?
- Which task board activities do you enjoy the most and why?
- What writing activities would you like to spend more time doing? and
- When you are working on the worksheets what are you learning?

Therefore, while core questions remained the same for each student, individual questions were asked about specific events observed in their classrooms. Interviews generally lasted thirty to forty five minutes. Again, the recording of the interviews was in note form and written in full immediately after each interview. Students were reminded prior to the interview about consenting to be interviewed and they were asked to confirm if they were still willing to participate.

Document Collection

In addition to observations and interviews, documents such as written policies, long term plans, and planning strategies were collected. Documents help to reinforce interpretations from data collected through other sources and they also help to identify any discrepancies between what may have been observed and what was actually planned by the teacher. Hatch (2002) refers to such data as artifacts which can give another dimension into the ways people think and act. These 'traces of human activity' provided information about how the participants interact within their setting.

Documents collected for this research included identification processes used by the teachers, assessment data on the gifted student participants, and relevant school policy documents. Additional data was collected from teachers' planning books, activity sheets, and student products. This data provided insight into the instructional strategies used by the teachers, the pedagogical basis for the classroom instruction, and informed me of the modifications teachers made to accommodate their gifted students. I consider these documents added to the richness of the data collected from observations and interviews. The dating of data was applied to all documents collected as some, for example, teachers

planning, and policy documents, were written before the research commenced. I was aware that this pre-study work may affect data analysis when comparing what was seen or heard with intended teaching practice. The responses to interviews, observation notes, field notes, and copies of documents were also coded to protect the anonymity and confidentiality of the participants.

Data Analysis

Hatch (2002) states a researcher must make a decision about whether the data "will be analysed in an ongoing fashion, at certain points, or only at the end of the study" (p.56). The data analysis in this research was an ongoing process as I undertook numerous reviews of the field notes, interview responses, observation notes, and documents. Analysis took the form of looking for patterns, topics, words, and phrases that could be coded into categories. This type of data analysis is described by Stake (1995) as taking something apart and determining how things relate to one another. Freebody (2003) records case study data to provide researchers with opportunities to compare and contrast interpretations and explore findings. In a case study, the nature of the documents collected also determines how the data is reduced and analysed with the researcher determining the relevancy and contribution to the findings (Stake, 1995).

In the analysis of the data collected, field notes and copies of documents were numbered and coded to indicate the classroom site. Interviews and observations were written up as they happened and Table 3.2 shows the steps taken in this analysis process. The question 'how does this teacher provide learning and teaching opportunities for gifted students?' was continually to the fore throughout the data analysis and from this process, strategies used by teachers in the classroom emerged. As Stake (1995) comments, it is important the final product accurately reflect the thoughts and words of the participants and to accomplish this, the teacher participants were invited to review and comment on the research findings prior to publication.

Table 3.2 Steps in Analysis Process

Step	Data Source	Process
One	Teacher Interviews	What teachers say they do to provide for gifted students in mathematics and literacy learning
Two	Teacher Interviews	Themes, key trends, patterns of similarity /differences between teachers' instructional practices
Three (In All Three Classrooms)	Observations	Identify key trends, patterns, emerging from the Classroom Observation Focus
Four	Observations	Similarities/differences of themes, patterns, across the three classrooms
Five	Documents	Evidence to support observations
Six	Documents	Themes and patterns across the three classrooms
Seven	Student Interviews	Student reaction to instructional strategies, key trends, patterns
Eight	Student Interviews	Similarities/differences of key trends, themes, patterns

As Berg (2004) suggests, the process of making data more readily accessible and understandable to the reader involves reducing and transforming the data to draw out various themes, patterns, and trends. Looking for key patterns and trends from the various data sources, I noted themes emerged to explain behaviours and interactions observed in the classrooms. Similarities and differences between each of the teacher's actions also became apparent at this time.

Triangulation

Triangulation occurs when two or more ways of data collection are used to investigate aspects of human behaviour and by getting more than one view of human behaviour gives a more accurate view of the phenomena under study (Compte, 2002; Flick, 2007, Merriam, 2002; Slavin, 1992). For this research, documents and artifacts were collected because "their non-reactive nature makes them one step removed from the participant's intervening interpretations (and) they provide an alternative perspective on the phenomenon being studied" (Hatch, 2002, p. 119). In this research, the data collected allowed the researcher to develop the process of triangulation and to strengthen the credibility of this case study by providing confidence that the behaviours observed were real patterns and trends confirmed through a variety of sources.

Coding

Coding is also an important practice in analysing data as it helps to illuminate the attitudes and perspectives of the participants (Bogdan & Biklen, 2003; Gibbs, 2007; Merriam, 2000). In this research, data was coded into categories to allow comparison with other data and descriptive categories were used to analyse the data into key themes related to each teaching situation and to the gifted students. This process involved 'inductive analysis' where new theories and explanations are guided by pre-existing frameworks (Flick, 2007; Gibbs, 2007). Induction in qualitative research therefore uncovers underlying patterns or trends present in the data and assisted in constructing a picture of gifted students and their teachers during mathematics and literacy learning in the primary school classroom.

Ethical Issues

Ethical issues were considered before the research began and involved gaining informed consent, ensuring privacy, mitigating any personal risk, assuring confidentiality and anonymity of participants, and organising the secure handling and ownership of all data. Berg (2004, p. 32) suggests ethical issues include the voluntary nature of the participants and their willingness to be observed and interviewed, for example a school board may decide that participation is acceptable but teachers may feel research is an invasion or

judgement of their professionalism and gifted students and their parents or caregivers may have similar feelings. To address these concerns informed consent was obtained from the Principal, Board of Trustees, teachers, and student participants and their parents prior to the research taking place.

Consent for students to participate was obtained from parents and caregivers as well as from the students themselves (Appendix 5). I considered it extremely important (validity and personal respect reasons) for students to be aware of why they would be observed, why they may be interviewed, and expressly that they had the right to withdraw from the research at anytime. Accordingly, I distributed to the students information sheets and consent forms. Other consent forms and information sheets, outlining the research, were addressed to parents and caregivers with a stamp addressed return envelope to me.

In preparation to collect data for this thesis I considered how to best to preserve the confidentiality and anonymity of subjects. Pseudonyms were given to teachers and the student participants to protect confidentiality. Names and identifying marks were deleted and obscured from all documents and participants were informed that while confidentiality and anonymity were not guaranteed every conceivable effort would be made to ensure protection of school, student, and teacher identity. Also agreed prior to conducting the research was any student who disclosed information that could not be kept confidential, such as physical or emotional harm, would be reported by me to the teacher or the principal. The three teachers were also invited to comment on the research before any findings were published.

Other issues requiring consideration included ensuring my behaviour followed appropriate cultural practices. I had to acknowledge that students and teachers bring to the classroom setting different perspectives moulded by their ethnicity and cultural practices. Making decisions about what to report while maintaining objectivity and reporting researcher bias were considered when student participants returned consent forms – in some cases after observations had begun. Another consideration was the

storage of data, both hard copy and computer data. This was solved by storing this information in the researcher's private safe.

Research must also have a purpose and should not be undertaken just for the 'sake of research'(Berg, 2004) and to meet this challenge I had to determine the value of conducting this research and ensure any outcomes generated have a purpose and do not 'harm' the participants in any way. Accordingly the research procedures and processes I chose reflect and recognise this ethical consideration. To ensure all ethical considerations were given due weight, research did not commence until an ethics application was reviewed by the Massey University College of Education Ethics Committee. The application process involved documenting the justification, objectives, and all ethical considerations related to the research. As there was no video taping or involvement of students under the age of seven this application was judged to be a low risk study.

Reliability and Validity

Reliability and validity are important considerations to be addressed in any research (Bogdan & Biklen, 2003; Merriam, 1998; Stake, 1995). Qualitative research is not concerned with right or wrong but rather producing "meaningful studies of the real world" (Bogdan & Taylor, 1998, p. 9). Because replicating case study research is difficult, for example, replicating the setting and participants can be problematic, the reliability in qualitative research comes from being able to assure the reader the findings of the investigation can be believed and trusted (Merriam, 2002). The premise is that the findings from research are consistent with the data collected so readers can determine if the results 'make sense' based on the data presented.

The presence of the researcher in the qualitative research context may negate the 'purity of a naturalistic setting' by altering participants' responses and impacting on the reliability and validity of research findings. For example, a teacher may modify their teaching strategies because they are aware their actions are being observed or students may react to having another adult in the classroom and tailor their behaviour accordingly. However, there is an expectation that consistency in observation results is achieved over

time thereby counteracting researcher presence (Bogdan & Biklen, 2003). To counteract my presence in the classrooms I made multiple visits to observe teachers' strategies and gifted students' responses in an effort to ensure reliability of findings.

In qualitative research, validity can be described as confirming the findings (Richards, 2005; Slavin 1992) but as the researcher has a role in creating the data generated they can influence all aspects of the research. Therefore from the design and analysis of data to the deductions drawn and publication of a report there is a need for researcher reflexivity. Because a researcher cannot place themselves outside the 'social world' there is a need to consider reflexivity as an integral part of research (Delamont, 1992). Through reflexivity the researcher acknowledges how they determined what data was collected and how that data is interpreted. Validity is also dependent on the way the data is represented and in order to acknowledge and prevent possible bias, the processes of this research were clearly communicated to all participants.

Validity too may be threatened if the constructs under study have different meanings for both interviewers and interviewees. For example, 'differentiation' or 'giftedness' may have different meanings for teacher participants depending on their own knowledge, experiences and interpretations. A disadvantage of interview responses may involve teachers wanting to 'look good' in the research or the students giving answers to please the researcher. I was aware of these potential biases and endeavoured to establish a professional rapport with all interviewees in a safe and secure environment. Accordingly, I took all measures necessary to adopt the stance of a 'good listener' and to set minds at ease with what was happening with the information being provided. The focus of this effort was to create an open and truthful rapport between the researcher and all participants.

Summary

This chapter has outlined the research design and the approach taken utilising the case study method. The Case Study approach sought to determine and understand the interactions occurring between a teacher and a gifted student in the teaching of

mathematics and literacy in a primary school classroom. In order to observe the teaching and learning process within a classroom the case study enabled a description of the events to be recorded as they unfolded.

Because this research involved both observing students and interviewing them, I have had to undertake precautions to avoid any harm to these student participants and have considered carefully the purpose of the research as well as the data collecting techniques appropriate to researching student's actions. I have also had to protect as much as possible the anonymity of the teachers involved in this research. This research was to determine and explain the classroom interactions of students and teachers and consequently it was not designed to judge the teacher's actions nor was it to interfere with the normal patterns of behaviours and interactions between the teachers and their students. The findings of this case study research therefore will highlight for the reader the reality of teaching and learning in mathematics and literacy for gifted students and their teachers within the regular primary school classroom.

Chapter Four

Classroom Findings

This case study was conducted through interviews of teachers and their gifted students and by observing the interactions in the classroom setting of gifted students, their classmates, and their teachers using the Classroom Observation Focus (Appendix 1). From the data collected, themes emerged to indicate teachers used similar strategies to each other in the teaching of mathematics and literacy. These themes were then examined and triangulated along with data from other sources such as student interviews and documentation from teachers planning and student products. The Classroom Focus highlighted teacher behaviours such as assessment, planning, and instructional strategies that when combined with student behaviours and responses created the unique activity within each classroom. The curriculum area, mathematics or literacy, was another influence on both the teacher's and the gifted student's behaviour.

This research determined the 'what' of the classroom, 'what' instructional strategies are used by teachers in each content area and 'what' affect these have on gifted students' learning. The separate classroom environments and the elements of the mathematics and literacy lessons are described to increase the readers understanding of the behaviours viewed in each classroom. While there are common teaching and grouping strategies utilised by all teachers there are differences in the responses of the gifted students to the teaching events in their classroom. It became apparent that while individualised instruction and modifications by teachers for their gifted students goes some way to cater for their learning needs, the gifted students themselves felt more was required before they were learning in their classroom setting.

The Teachers' Perspectives

The teachers were interviewed prior to classroom observations and when asked to describe the instructional strategies they used within their classrooms, they identified ability grouping, open ended questioning, and acceleration or enrichment as strategies. Other strategies which emerged across the three classrooms are outlined in Table 4.1.

Table 4.1 Instructional Strategies Teachers Said They Use in the Teaching of Gifted Students in the Regular Classroom

Assessment of student readiness
Flexibility of group membership
Open ended challenges
Higher order thinking tools
Individualised instruction

To ascertain how effective the instructional strategies were, the teachers said they used assessment tools, such as diagnostic testing, talking to the students, observing student responses, and examining student products against success criteria.

When asked to define giftedness and how they identified gifted students in their classrooms, teachers' responses indicated diverse understandings about giftedness and gifted education including a gifted student may show mastery really quickly or display an ability to think divergently. Giftedness was also seen by the teachers to include:
Outstanding ability in certain but not all areas
Bright but something else is going on too
Completes work too easily

The teachers stated giftedness could be identified in the classroom by using a variety of school wide identification procedures. Many of the identification procedures described by the teachers included formalised testing and knowledge of the student working within the classroom setting. Identification was also seen as:

Looking for the reasons behind behaviour
Looking at test results and classroom responses
Looking at and listening to students responses to creative thinking activities

Asked to respond to the question of why anything 'extra' should be done for gifted students in the regular classroom the teachers indicated the structured way of teaching mathematics and literacy, for example the tendency to teach in ability groups, shows up the differences between students whose testing results may be similar but whose responses to group work may highlight a deeper understanding. Also students who did not test well may often be identified as having superior knowledge to their peers when working in the group situation. As the three teachers stated, something is needed for these students in order to:
Meet their obvious learning needs
Challenge and broaden their (gifted students) knowledge
Avoid boredom for the gifted student

Teachers were also asked to identify the barriers to teaching gifted students in the regular classrooms. The trends which emerged from interviews and from informal discussions with teachers centred on the major issues of time, resources, classroom size, and knowledge of giftedness. These four principal areas of concern were identified by all teacher participants with one teacher summing up the barriers to teaching gifted students as simply '*not knowing enough*'.

Observations

Classroom observations were conducted using the Classroom Observation Focus (Appendix 1). Using an observation focus helped me identify the instructional strategies the research literature implied would be most effective in the teaching of gifted students. The instructional strategies used by the three teachers were then compared to those observed and the student responses to these were recorded. Patterns emerged from the classroom observations of both content teaching areas (mathematics and literacy) and across the three classrooms. These patterns revealed themes which were triangulated

against the data collected from planning documents and teachers' interview responses. These themes emphasised the use of higher order thinking skills, enrichment activities, ability grouping and individualised instruction in both mathematics and literacy teaching and learning to be held in common across all three classrooms. It is interesting to note that these themes, and others recorded in Table 4.2, are strategies recommended to use when teaching gifted students.

Table 4.2 Themes from Classroom Teaching

Assessment of student readiness
Recognising prior knowledge
Opportunities to work with like-minded peers
Sharing learning goals
Using a wide variety of materials
Pair-share
Addressing different modes of learning
Self evaluation by students
Learner-centred environment

What follows is a description of each classroom observation and the trends which emerged from the data collected from the student interviews.

Classroom One

This was a mixed ability classroom of fifteen Year 6 and fourteen Year 5 students. Five students in this classroom had been identified as gifted using the school wide identification processes (Appendix 6) and included three boys and two girls; Shirley, Bert and Bill (Year 6) and Susie and Jack (Year 5). Jack, Shirley, Bert and Bill are globally gifted with strengths in both mathematics and literacy. Susie shows particular strengths in literacy, especially her love of Shakespeare and her ability to write and articulate her ideas. The teacher in this classroom had eighteen years of teaching experience and a

strong belief in the teacher being a 'guide on the side'. The classroom was arranged with a large area for whole class teaching, a mobile teaching station to be used for small group teaching, and a data projector for whole class teaching. Spaces had been created for students to work independently on computers, laptops were available for individual or pair activities, and other materials, such as books and mathematical equipment were readily accessible.

Ability groups for mathematics and reading were displayed and students were assigned to these groups based on Numeracy Project strategy testing, Progressive Achievement Tests (PAT), running records for reading, Standardised Test for the Assessment of Reading (STAR), Assessment Tools for Teaching and Learning (AsTTle), and demonstrated student achievement. These groups were flexible based on the topics being taught in the respective curriculum area and task boards directed the students to their daily activities. A timer was used both in mathematics and literacy to alert students to move to a new activity. Overall, the mathematics and reading and writing sessions lasted for approximately 45 minutes with mathematics between 9.30 am and 10.15 am, reading at 10.50 am until 11.30 am and writing activities from 11.30 am to 12.15 pm. However, this timetable was not rigidly adhered to as reading and writing activities often merged together or session times were altered to accommodate other aspects of school life.

The classroom observation focus directed my attention to the differentiation of the classroom programme for the identified gifted students and the instructional strategies used by the teacher. There was also a student teacher in this classroom but I did not include observations of their teaching practice in this research. It was considered that their presence would not influence the outcomes of this research.

Mathematics Observations

Mathematics sessions generally began with whole class instruction about the day's activities. This time was also used to elicit from students their prior knowledge relevant to the day's teaching. From this general introduction, fifteen minutes of basic facts activities were undertaken in groups predetermined by the teacher based on accumulated

assessment. The students then broke into groups for independent work, pair activities or group work with the teacher based on the current unit of study. The instructional strategies used by this teacher included assessing for prior knowledge, acceleration, and giving opportunities to work with like-minded peers. Many of these strategies are highlighted in the gifted literature as being appropriate for teaching gifted students. Other instructional strategies observed in this classroom are listed in Table 4.3.

Table 4.3 Instructional Strategies Used By Teacher One In Mathematics

Assessment of student readiness
Grouping of students in ability groups
Planning specific content and related activities
Sharing learning outcomes with students
Higher order questioning
Pair-share
Homogenous group instruction
Whole class instruction

In undertaking basic facts activities the students had a selection of activities and could choose who they worked with within their group. It was noted students tended to work with the same partner selecting the same activity each time. The teacher commented that: *The 'basic facts activities' might not be stretching the gifted students and could be more advanced.*

In the first observations the students were working on statistics activities in heterogeneous groups, with Jack and Bert assigned to the same group. The unit on statistics had begun prior to observations commencing and the students were in the process of analysing the information they had gathered and reflecting on the questions used to gather their data. During the first session a list of instructions was given to each group of students before they began their tasks and the teacher moved from group to group asking the students to articulate what they were doing asking questions such as:

Why do we have statistical investigations?
What do you think you do with the information gathered for graphs?
Why is the design of the question important?

Each group was also asked to explain what their next step would be and how they were going to communicate their results. There were also opportunities for students to work in pairs on a computer programme looking at examples of statistical investigations. This was to develop their knowledge of how to present the information they had gathered.

The second observation began with a whole class discussion of the previous day's activities and involved the students turning to a partner seated near them to share their ideas (pair-share) about how to write up the information represented in their graphs. Following this, the teacher explained the sequence all groups would need to complete to present their information. Jack voiced many ideas and it was noticeable that the teacher asked him to answer many times. I observed that Shirley did not volunteer any answers and when she was asked about this later she recounted:
If I don't know I won't volunteer....Jack would just like to rub my nose in it if I am wrong ...I'm really a perfectionist and it is hard to accept if I get things wrong

Bert could always answer if the teacher asked him a question but never volunteered an answer. This lack of participation was noticed at other times too and when asked why he did not answer questions during group instruction offered:
I probably wasn't listening...I don't all the time listen to group stuff
But how could you know which question to answer if you weren't listening?
I just can sometimes... but not if it is a really hard question

Subsequent mathematics observations occurred when the students were working on percentages. Planning revealed the students had been pre-tested and placed in ability groups with Shirley and Jack forming the 'top' mathematics group together, Bert and Bill working in the second group and Susie in the third. Planning included the acknowledgement of mastery, outlined the concepts to be taught, questions to be asked,

and activities to support each group's teaching points. These mathematics sessions began with all class members participating in Basic Facts activities in their assigned groups or engaging in a whole class activity related to a number knowledge concept. Each group then rotated to complete two teacher chosen activities from their task boards. These activities included:

- computer tasks,
- practice of a concept that had been previously taught,
- group work with the teacher, and
- independent mathematics activities which included a selection of games and activities to be completed with a partner.

Computer tasks and practice were an individualised activity but there was interaction between all classroom students as they asked each other for clarification. There were many opportunities for all students to pair-share during mathematics sessions and when asked about how they felt about having to articulate what they were doing the gifted students replied:

Boring to explain all the time...the teacher could just ask for alternative ways for working things out

Makes you feel the teacher cares you can work it out

Sometimes I do long equations in my head that can be hard to say how I did them

... hard to explain when you just know the answer.

The teacher differentiated the content by using a range of materials and by modifying the questions asked, especially when working with Jack and Shirley. These students were working on mathematical concepts in advance of the other students in the classroom. When they showed they had knowledge of the concepts being taught the teacher moved onto new concepts and probed more deeply, asking the students to explain the strategies they used to solve the problems. The teacher asked questions including:

How did you get to that answer?

Show me how you know?

Explain to me how you reached that conclusion?

Observations of Bill and Bert occurred when they were in their group also solving percentage problems. During group work with the teacher they recorded their answers, showed how they arrived at their answer, and when asked would share their strategies with the group. Bill and Bert always had an answer written down but did not often volunteer strategies unless asked directly by the teacher. All the gifted students were asked how they felt when working in groups for Mathematics and they responded with:

Good...when you get stuck

It's easier...don't have to think

Not good when you could be going on and learning new stuff ... figuring things out for yourself

Torture....especially when you're the only girl....too much competition sometimes...

From the gifted students' responses it is easy to see that working in groups does not always best meet the needs of these gifted students.

Literacy Observations

Literacy sessions were separated into reading and writing with the boundaries between these content areas often blurred when tasks for reading and writing became concurrent activities. For example, the students were identifying examples of 'inference' by authors, writing their own short stories using 'show don't tell' and reading short stories to each other. The teacher always gave clear instructions about the activities to be undertaken by the students and there were clear expectations about the tasks the students were asked to complete. The instructional strategies consistently used by the teacher included assessment, ability grouping, and opportunities for students to self evaluate their products. Other strategies used by the teacher are highlighted in Table 4.4 and it should be noted that these strategies are similar to the instructional strategies observed in mathematics sessions.

Table 4.4 Strategies Used in Literacy by Teacher One

Assessment of student readiness
Acknowledging prior knowledge
Whole class instruction
Ability group instruction
Sharing learning outcomes
Self evaluation (success criteria)
Choice of activities
Individual instruction
Acceleration

Reading

Reading always began with silent 'whisper reading' for 10 to 15 minutes. The students brought books from home or used the classroom and school library resources. The purpose of this activity was for students to read for a sustained period of time. Many of the gifted students commented later this was a favourite time for them and they would have continued to read for much longer if they could, except for Bert who insisted that he read *only because he had to!* Following whisper reading, whole class instruction was used to direct students to the reading task board which outlined each of the four reading group's activities. Task board activities included:

- sustained quiet uninterrupted independent reading time (SQUIRT),
- reading journal responses determined by the teacher,
- follow-up work set by the teacher after group instruction,
- vocabulary worksheets, and
- 'teacher's choice' - publishing personal writing or reading short stories to a partner.

Jack was not in a reading group as his reading ability outstripped his classroom peers. He was given individual instruction by the teacher several times a week during whisper reading time. This was the only way the teacher could accommodate Jack's learning

needs within the confines of the classroom structure. When asked how he felt about being on his own he replied:

I know what the teacher is doing...having me on my own. But it can be boring sometimes on my own...but the next group, the ' Violets' the work is too easy, even though I enjoy doing it

However, Jack was frequently watched completing the same activities as Susie, Shirley, Bill, and Bert who constituted the 'Violets' reading group even though the teacher had other activities available for him to undertake. During the observation period the learning outcomes (LOs) for the Violets were to make sense of a text by recognising information that has not been directly stated and follow-up activities included vocabulary worksheets. The teacher reiterated the LOs several times during group sessions to direct and focus the students on the task they were undertaking. Questions asked by the teacher demonstrated higher order thinking was used to elicit students' responses and the students were always asked to justify or clarify their responses. Questions asked by the teacher included:

Who do you think is the intended audience of this text?

What in the text tells you?

How about.....what would you do to show this?

What do you mean by....?

Explain how you came to that conclusion?

Writing

During the observation period the students were writing their own short stories and evaluating their work based on the success criteria that had been established by the teacher prior to observations commencing (Appendix 9). Whole class instruction began with critiquing a passage from a past student's writing and through questioning which included:

Can I infer some things not directly stated?

What tells you that?

How do I know that it is a game'?

What words can I use to portray feelings of nervousness?

The students were focusing on 'show, don't tell' and they had to include this feature in their own short story. They were asked to pair-share what they knew about 'show don't tell' and several students were asked to report back to the class. There was discussion about how many sentences could be needed to illustrate a point the writer wanted to make and then the students were directed to look over their own stories for examples of where they could use 'show don't tell'. Any students still struggling with the concept could continue with the teacher. Students were also reminded of the success criteria the teacher would use to measure the effectiveness of their story writing. As the observations progressed many students completed writing, editing, and evaluating their stories. All the gifted students finished writing their short stories except Bert who found recording ideas a slow and tedious task. However, when later encouraged to write directly onto the computer a short story was achieved relatively quickly. The other four gifted students had completed their short stories and had self-evaluated them using the success criteria.

Classroom Two

The second classroom was a mixed ability classroom of seventeen Year 6 and twelve Year 5 students. There were four students identified as gifted in this classroom. Felicity was a Year 5 student gifted in literacy and Ben, Todd, and Ryan were Year 6 students. Ben and Todd were gifted in mathematics and Ryan was gifted in both mathematics and literacy. These students were well integrated into the classroom setting although Ryan and Todd often appeared to be aloof by not engaging in classroom activities. For Ryan, the temptation to take charge in co-operative group work was overwhelming at times making him unpopular with his classmates. The teacher in this classroom had nine years teaching experience and emphasised her role as 'facilitator' of children's learning. A graduate teacher trainee was also present once a week.

This classroom had whole class and small group teaching spaces and a timer was used to regulate activity changeovers. Mixed ability co-operative seating groups were often used during literacy learning for pair-share activities. The ability groups for reading and mathematics were posted on the wall with membership based on standardised testing,

Numeracy Project strategy testing, and demonstrated ability by the students. The task board activities for mathematics had students engaging in the following activities:

- computer based practice of concepts and basic facts practice,
- worksheets to complete after group work with the teacher, and
- independent mathematics activities including a selection of games and activities to be completed with a partner.

Reading and writing activities were also displayed on task boards with the teacher directing the activities undertaken each day. These tasks included:

- using Inspiration (computer programme) to construct a recount,
- publishing recounts on computers,
- guided silent reading with teacher,
- listening to recounts on using a Listening Post while reading the text,
- independent reading box for choosing stories to read,
- sustained, quiet, uninterrupted, independent reading time (SQUIRT), and
- reading journal responses.

The timetables for mathematics and reading were the same as for classroom one and recent syndicate-wide testing on fractions had resulted in all students across the three classrooms being cross-grouped in ability groups. This was a new practice for this syndicate and was a trial to see if it resulted in better learning for students and a more manageable workload for teachers. Changes to the grouping resulted in Ben, Todd, and Ryan going to classroom one four days a week during mathematics, where they were assigned to different ability groups, with Felicity remaining in her own classroom. In their own classroom Ben, Todd, and Ryan worked in the same group for number knowledge. The instructional strategies used by their teacher were similar to those already encountered in classroom one, and included ability grouping and assessing prior knowledge. Other strategies used are listed in Table 4.5.

Table 4.5 Instructional Strategies Used in Mathematics by Teacher Two

Assessment for student readiness
Planning for content /activities
Sharing learning outcomes
Higher order questioning
Pair-share
Co-operative grouping for activities
Ability grouping for instruction
Whole class instruction

Mathematics Observations

The first observation began with the teacher explaining the day's activities with the students' attention being directed to the task board activities before a whole class activity of Hangman Decimals was undertaken. The students then broke into their groups with Ben, Todd, and Ryan working with the teacher. The students were exploring division and finding factors of numbers and recording their answers on an individual white board. They were asked to justify how they were arriving at their answer and to explain the strategies they were using with prompts such as:

Now show me how you got that?

I can see how you are trying to get there...

Ryan wrote down an elaborate way to work out the answer, erased it all and wrote another way to show the answer but would not show his workings until everyone else had given an answer. When asked why he did this he replied:

How I got the answer is sometimes... I just know... and don't know how I could explain it

Ben and Todd articulated how they were solving the problems posed by the teacher and recorded clearly how they had arrived at their answers. They did not volunteer information unless the teacher specifically asked for their input. When asked to explain what they thought about working in groups they replied:

Working in groups is annoying... when others feel jealous you can answer
Groups can help you to learn...give ideas when you might be stuck
Are you ever stuck for an answer?
Not really... but having to explain how you did something shows you just didn't cheat and rely on others... and the teacher knows you know the answers...that's good

Overall, mathematics lessons were structured to provide teaching time, opportunity for new concepts to be practiced through games or worksheets, and independent activities which tested basic facts or allowed for revision of previously taught mathematical concepts. The students were expected to complete these activities independently while the teacher worked with other groups. There were many opportunities for students to articulate what they were doing and their understanding of concepts. This also gave the teacher feedback to be able to move the groups forward if everyone has understood the concepts being taught. However, while this opportunity presented itself several times, the group did not move onto the next step without having first completing all the planned activities.

The gifted students were observed to often finish their practice activities quickly. They chose either chose to play a game or drifted around the classroom 'looking for something' to do. When asked what they would change about learning mathematics the student's replies included:
Having harder games to play
More challenges in the work we do in our books
Not having to wait for others to catch up...that can be boring

Two other mathematics observations of Ben, Todd, and Ryan occurred when they moved to classroom One. Ryan was observed to be more engaged with the mathematics activities than when he was in his regular classroom. He was not in the 'top' group as he was in his own classroom and he had competition from other students who were faster at answering questions and coming up with strategies to solve problems. Asked to explain what he thought of moving classes for mathematics he said:

Moving classes gives you more levels...more ideas about how to work things out...
And Todd commented that moving to another class for mathematics meant:
There is more to learn... to catch up with the groups in front of you

The teacher's planning revealed opportunities for students to be challenged in mathematics but often the gifted students did not take up these challenges and instead opted to engage in activities that they could easily accomplish, often choosing to work with peers who could also easily complete the activities. The students were expected to be self-motivated and responsible for their own learning including the individual responsibility to get on with activities without teacher motivation or supervision. Observations during this time often showed the gifted students 'filling in time' in their own way and not always engaged in the mathematical activities provided.

Literacy Observations

Literacy sessions were structured in much the same way as in classroom One with homogenous reading and writing group membership based on diagnostic testing. The instructional strategies emerging from the observations in this classroom included assessment, sharing learning outcomes, and opportunities for choice. Other strategies are highlighted in Table 4.6.

Table 4.6 Strategies Used in Literacy by Teacher Two

Assessment of student readiness
Prior knowledge
Ability groups
Sharing learning outcomes
Success criteria for self evaluation
Choice
Co-operative grouping for activities

Reading

Each observed session began with sustained silent reading. The reading material was student selected from a variety of sources, home, class or school library. Planning was detailed for each of the four reading groups and included the resources to be used, the questions to be asked, and the student activities. Felicity, Ben, and Todd were in the same reading group and in the first observation they were reminded of the purpose of the lesson; to infer what is going on in a text. The students were asked to review a story from a previous session with the teacher directing questions at particular students or asking the students to pair-share with others around them. The gifted students answered questions and interacted with the other members of their group, but when asked what it was like to work in a group for reading, responses were mixed:

Groups help you to answer the questions

I'd rather read by myself

Having to slow down to keep up with group ...I'd like more challenge in reading groups

How do you think this could be achieved?

The teacher should ask us harder questions so we have new things to figure out

Writing

In writing sessions the students were focusing on writing a recount. The teacher's planning revealed the features of a recount had been systematically taught as a whole class activity culminating in the students writing their own recount. In the first observation, a whole class review of the features of a recount activated students' prior knowledge with the teacher asking them to confer with others around them to discuss the purpose of a recount, why they might need to write one, and who the intended audience of a recount might be. During this time I observed Ryan to be inattentive and when he was asked to pair-share he appeared to be disinterested in the whole process. Felicity shared her thoughts with those around her and often raised her hand to report back to the whole group, but was not often asked to contribute.

The second observation occurred when the students were seated at their own desk groups which formed mixed ability co-operative learning groups assigned by the teacher. None

of the gifted students were in the same group. The students were given a feature of a recount, for example, amazing adjectives and were then asked to design a poster to help other students to remember how to use that feature in their writing. What constituted a good poster was discussed as was how to develop a slogan for their poster. Eventually the students chose a partner from within their seating group, the teacher assigned each pair a feature of a recount, and the designing of the poster began. Ben and Todd worked with their respective partners and managed to design the layout of their poster and come up with a slogan relatively quickly. Felicity and her partner took some time discussing the layout of the poster and Ryan decided to design his own poster leaving his partner to do the same. The teacher insisted they work together and they managed to combine their individual efforts by the end of the lesson.

Another writing observation involved whole class instruction again about the features of a recount. A piece of writing was displayed and in co-operative seating groups the students were asked to identify the time connectives and amazing adjectives. They were then asked to move and sit with someone from their writing group to write sentences using the features under discussion. There were different expectations for each of the four writing groups. I asked the gifted students what they felt about whole class instruction and being involved in activities in co-operative group situations. The responses ranged from:

I would like to spend more time on writing and not so much on talking about what to write

I think we should just plan the start of our stories and then just write

I like to share ideas with the whole class...it gives me ideas to write about

It is better if the teacher just explains how to use metaphors and similes and time connectives... then we can get on with writing.

It appears working in groups has both positive and negative effects for these gifted students with much of the group work too slow and repetitious for them. Even when others of similar ability are included in the group the interactions are not always perceived, by the gifted students, to be worthwhile learning opportunities.

Classroom Three

This was a classroom of five Year 4 students and twenty four Year 5 students. The teacher was a first year teacher who had begun teaching this class at the beginning of Term Three. Three gifted students had been identified in this classroom, Marco and Tania (Year 4) and George (Year 5). Marco had difficulty fitting into the regular classroom environment and had behavioural needs which required the teacher to manage his learning and social relationships carefully. Tania was exceptionally gifted and had been accelerated a year group by a previous school. In this classroom she was often relied on to perform routine tasks such as getting the computers set up. George was globally gifted with strengths in both mathematics and literacy but he did not interact very much with the other students. These students were recognised by the teacher as having different learning needs, and a 'thumbs up' strategy was used so they could excuse themselves from group or class instruction to continue with special activities set up by the teacher. As in the other classrooms, there was a comfortable seating area for whole class teaching, a mobile teaching station for small group work, and a timer to alert the students to a change in activities.

Mathematics Observations

The students were once again split into ability groups for mathematics across the three classrooms and therefore the observations of Tania and George took place in other classroom settings. Marco remained in his own classroom for mathematics as Numeracy Project testing had highlighted gaps in his mathematical knowledge. When he was observed working with his ability group the teacher had him answer several of the questions (most difficult first) while she gave the rest of the group their first problem to solve. If Marco showed mastery he could complete several more practice examples and then move to the computer activity assigned to his group or carry on with his own pursuits (at that time he was working on a climate change project). Other instructional strategies used by this teacher, including higher order questioning and assessment, are recorded in Table 4.7.

Table 4.7 Instructional Strategies Used in Mathematics by Teacher Three

Assessment of student readiness
Prior knowledge acknowledged
Ability group instruction
Planning for content /activities
Sharing learning outcomes
Higher order questioning
Pair-share
Co-operative grouping for activities
Most difficult first

Observations of Tania and George showed they were very able students who easily answered the questions posed by the teacher and articulated the strategies they used to solve problems. George stated he was stimulated by the activities and concepts he was exposed to when he changed to classroom One for mathematics. In his own words:
It is challenging for me to swap classes and work with the others in there. I am just learning some new things about mathematics.
In his own classroom for mathematics, George was researching square roots using the computer to find games and websites that would explain square roots to other students. He was very engrossed in this activity even when it proved to be difficult for him to find suitable sites others would be able to understand.

Literacy Observations

Reading sessions all began with sustained silent reading followed by group work and activities related to the reading or writing focus. The teacher's planning for group instruction included the questions to be asked, the activities for each group, and expected student products. During observations the reading groups were focusing on 'inferencing' and in writing the students were engaged in writing personal recounts. Success criteria on which they would evaluate their work had already been established by the teacher and students prior to my observations. The teacher had modified the classroom programme to

specifically meet the learning needs of her gifted students allowing them to show 'thumbs up' during whole class teaching if they knew what was being discussed. The students could then go on to complete activities from a 'tic tac toe' of activities which were different to those activities expected to be completed by other students in this classroom (Appendix 10). These activities were also linked to current reading and writing topics and the teacher checked on the progress of these students during group reading sessions.

It was observed the gifted students often stayed for the beginning of the whole class activity before beginning independent activities. When asked how they felt the about the 'thumbs-up' rule the students responded:
It is good that I don't have to stay on the mat...if we know what to do we can finish things more quickly and then get on with free choice activities
We do the same as everyone else just faster, so we can get on with things that we want to do
Means I don't get bored with the teacher explaining things... sometimes I already know what she is saying or I can work it out for myself

In Table 4.8 the instructional strategies used by this teacher, such as providing for individual activities, opportunities to work in ability groups and acknowledging mastery are recorded as well as other instructional strategies that were observed.

Table 4.8 Strategies Used in Literacy by Teacher Three

assessment of student readiness
prior knowledge and mastery acknowledged
ability group instruction
sharing learning outcomes
success criteria for self evaluation
individual activities
'thumbs up'
higher order thinking activities

This was the only classroom where students could opt out of an activity if they could show mastery. The technique suited Marco's style of learning and helped him to be more on task and engaged in learning. It was also an opportunity for the other gifted students to be able to control their participation in group work and whole class teaching strategies.

Reading

An observation of Marco's reading group began with the teacher reiterating the learning intention as 'looking for clues the author has left behind'. This was written in a large scrapbook for the students and also recorded were the steps to accomplish this activity, for example, read the text carefully, read the questions, re-read the passage. The students were then given the text to read and a set of questions to answer. Marco participated in this group activity and answered the teacher's questions. When asked what he enjoyed most about reading sessions he replied:

I like to know what I have to do then I know what I need to understand...the group stuff can be slow even when I know the answers...sometimes I just play but sometimes... I can learn things from my friends in the group

Another reading session saw George and Tania leave their reading group to work on the 'tic tac toe' activities. Their reading group was later involved in reading theatre but George did not participate and later stated that:

I don't like plays, always arguments about who is going to play the characters

Writing

Writing sessions began with whole class discussion of the 'time connectors' that could be used in recounts. This was one of the success criteria on which the students would later evaluate their own work. The three gifted students participated in this activity for a short time to help compile a list of time connectors but then they used the 'thumbs-up sign' and started on their own activities. Tania and George had completed their recounts while Marco had yet to edit and publish his work. During another writing observation the students were again asked to continue to edit their recounts but as the gifted students had

finished this task they worked on the 'tic tac toe' activities. When asked about what they liked or disliked about writing their responses were varied and included:

When we talk about how to write it reminds me of the things I need to use to make my story better

It would be good to be able to have a choice...to write about what we want to and to write poems or something, not always stories

Free choice to write stories...I' m writing a chapter story at home... I could do some of that at school

While it was clear the gifted students enjoyed 'choice' in writing activities, many of the activities offered enrichment rather than differentiated activities.

The Students' Perspectives

Themes emerging from interviewing the gifted students showed that the students were well aware of their place as learners in the classroom and how they best liked to learn. They articulated why they thought their teacher used instructional strategies such as groups and whole class teaching and they were also aware they easily completed much of the work they were asked to do. These gifted students recognised that their teachers acknowledged their strengths and tried to give them *'work that makes me think'*. The patterns emerging from the gifted student's views of their learning and the teaching strategies employed by the teacher in mathematics are noted in Table 4.9. These include that the gifted students felt there was too much repetition of material they already knew with little choice or challenge in what they were asked to do. The students felt there was too much practice time for concepts they could master quickly and they disliked the slow pace of the groups.

Table 4. 9 Themes that Emerged from Mathematics

Games were easy but fun
Groups helped you to understand
Challenge not always present
More time to spend on what they enjoyed
Less repetition
Pace of group too slow

Similar themes were found to emerge from reading and writing activities. Table 4. 10 and Table 4.11 highlight the themes that emerged when the students were asked to identify what could be different about literacy lessons. It is noticeable that while the students say learning in groups and from others can be useful and rewarding, they still perceive problems with working in the group setting. The pace of learning in groups is too slow, listening to instructions can be tedious, and the gifted students felt there was little opportunity for them to demonstrate how much they already knew about reading and writing.

Table 4. 10 Themes that Emerged from Reading

Group work can help understanding
More time for 'just reading'
Worksheets are too long
Group pace too slow
Cannot show how good at reading they are
Questions asked by the teacher can challenge

Table 4. 11 Themes that Emerged from Writing

Critiquing others work helps in own writing
Whole class instruction too long
More choices in topics to write about
More time to spend writing own stories
Cannot show how good I am at writing
Too much repetition of how to write

The themes can be merged together to provide an overall pattern of the gifted students' responses to what happens during mathematics and literacy sessions. These themes, represented in Table 4.12, clearly show the gifted students feel the pace of instruction is too slow in both mathematics and literacy and that there are few opportunities for them to engage in their own pursuits.

Table 4.12 Themes from Student Responses

Pace too slow
Lack of challenge in content
Group work under stimulating
Less time on repetition of concepts
More time to explore own interests

Pace Too Slow

Although many students responded they needed the teacher to explain skills to them they were often waiting for others to achieve understanding and for them this was seen as time they could be doing something else. Several of the students complained:

I wish we didn't go over things too many times

When I know how to do things or know the answers I just want to get them out but I have to wait for the teacher to ask me or for others to realise what the answers are

Lack of Challenge in Content

The students did not feel they were challenged very often in their classroom. Even when they did not know the answers or did not understand how to do a task, they felt they could easily learn or even work it out for themselves. What they deemed to be challenging was often having a choice in activities and not being asked to repeat things they had already mastered.

Group Work Under-Stimulating

There was little difference between the students' responses to working in ability groups and co-operative groups and no clear preference for working in either group. Many of the students interviewed responded to questions about group work with comments such as:

You end up doing things by yourself if the other do not co-operate

I have learned how to work in groups...I know what I have to do to give the others the answers without letting them know... that way I usually get to do the things in the group that I like to do. I am best at directing what others do

It takes so long to do it in a group...I could do it faster on my own

When asked what was good and bad about working in groups the gifted students had different ideas, but while most agreed working in groups could help them to learn or give them ideas, it generally meant 'waiting for others to learn'. This was especially evident when whole class teaching took place. While gifted students appeared to accept that working in either heterogeneous or homogenous groups was a part of belonging to the classroom they preferred more individualised instruction.

Less Time on Repetition of Concepts

The gifted students felt time they spent waiting for other members of the group or class to 'catch up' or 'catch on' was frustrating. They also perceived they would be better off being able to pursue areas of interest on their own where repetition of skills and content were unlikely to occur. Examples of this from the student interviews include:

Going over and over things is okay for people who don't know...I just tune out

I knew how to read before I came to school...how can I let the teacher know what I know about reading

Worksheets are okay for the first two or three things....but then you get bored with having to do more and more examples

The students showed a clear preference for autonomy of action about how and what they were learning and there was a mismatch between what was occurring in the classrooms and what the students felt they could be capable of doing. They concluded there was little opportunity for them to pursue individual 'passions' when time was spent on tasks they already knew how to do or which they learned very quickly to master.

More Time to Explore Own Interests

Asked what they would do if they had a choice in their classrooms most of the students replied they would read or write and research about the things that they were interested in. According to the students:

Everyday spent at school is one less second I have to be there

I think it would be good to be able to show the teacher what I can really do

Several students said they learned more at home and knew things they couldn't show at school and this highlights the mismatch occurring between the instruction in the classroom and the learning needs of these gifted students.

Summary

The findings of this case study illustrate the various ways regular classroom teachers provide for their gifted students in mathematics and literacy. Themes emerged from the data analysis to illustrate similarities in the way the three teachers plan and teach their gifted students. These themes also illustrate the cyclic nature of teaching in that:

- assessment leads to planning for identified learning needs,
- planning leads to choice of content, processes, products, and learning environment,
- content, processes, products, and learning environments are assessed, and
- assessment leads to planning for identified learning needs.

The assessment phase was an important component held in common across all three classrooms and the teachers relied on assessment to inform their planning and subsequent teaching. The teachers also used assessment to organise their students into ability groups for instruction with much of the instruction in all three classrooms undertaken in ability groups. While the three teachers knew what individual students could be capable of, there was still a focus on teaching to deficits identified by assessment. This resulted in the gifted students spending many classroom hours repeating what they could master in a few practices and working in ability groups which had a range of abilities within them.

Some modifications were made to the classroom programmes, for example 'tic tac toe' activities and an individualised reading programme. These modifications represented challenge for the gifted students however, despite the teacher acknowledging a student's individual needs it is apparent from the students' perspectives that this differentiation does not go far enough. The students feel disadvantaged by having to work to the pace of the group and having to wait until all group members have reached mastery before being able to move on.

The results of the student interviews clearly identify that the time gifted students spend in their classrooms can be time in which they are not often exposed to new material, or they are exposed to new ideas so slowly that learning becomes tedious. Three themes clearly emerged from the students' perspectives and these themes also sum up the findings of this research. These themes suggest that gifted students want instructional strategies from their teachers that create (in their regular classroom setting) challenge, choice, and flexibility in how and what they are learning.

Chapter Five

Discussion

The purpose of this study was to gain insight into the instructional strategies primary teachers used to cater for the gifted students in mathematics and literacy learning within their regular classroom setting. This study focused on three individual teachers and identified similarities and differences in the ways all three taught mathematics and literacy to their gifted students. This Chapter analyses the instructional strategies used by these teachers and also records the students' perspectives about learning in their classrooms. These components are then discussed in relation to the literature presented in Chapter Two. These research findings could influence individual teachers' future teaching practices by helping them to implement suitable strategies that effectively meet the needs of gifted students.

The research question 'what strategies do New Zealand primary school teachers use in their classrooms (Year 4-6) to provide teaching and learning experiences in mathematics and literacy that cater for the identified needs of a gifted student?' was addressed by examining three broad aims. Firstly, data was collected through observations and document collection about the strategies regular classroom teachers use to provide teaching and learning experiences in mathematics and literacy that cater for the identified needs of gifted students. Then the views of both the teachers and the gifted students about the teaching and learning programmes in mathematics and literacy were elicited through interviews. Lastly descriptive examples of how teachers in Years 4-6 primary school classrooms are catering for gifted students' diverse learning needs were determined through data analysis. In determining the findings, descriptive data was uncovered that provides the answers to the following six supporting questions:

1. What do teachers need to 'know' about gifted students so they can identify strategies to use to meet a student's needs?
2. How do teachers plan and utilise strategies for gifted students?
3. How do classroom teachers modify instructional practices and curricular materials to meet the needs of gifted students?
4. How do the strategies lead to differentiation of content, process, and products of classroom programmes?
5. How do teachers evaluate the effectiveness of the strategies they use to specifically target gifted students learning experiences?
6. How do students evaluate the effectiveness of strategies used by the teacher?

The discussion that follows answers these questions by comparing the issues raised in the Literature Review with the findings that emerged from this case study.

1. What do teachers need to 'know' about gifted students so they can identify strategies to use to meet a student's needs?

As previously identified in Chapter Two, giftedness is difficult to define as gifted behaviours are diverse and unique (Clark, 2008; Davis & Rimm, 1998; Moltzen, 1996). Usually no one gifted student will manifest exactly the same abilities and cognitive or affective needs as another gifted student. Teachers therefore have a difficult task in deciding how to provide for the differences between gifted students and their same aged peers as well as for the differences between gifted students themselves. For example, a student gifted in mathematics may not be gifted in literacy or vice versa and the ways in which they are gifted in these areas may also be dissimilar.

A gifted student may also be reluctant to show their giftedness or their giftedness may remain unidentified. The literature reviewed for this research also outlined myths associated with giftedness, such as 'they will make it on their own,' and it is against this backdrop teachers struggle to define who they are looking for when identifying gifted students in the classroom. Baldwin, Vialle, and Clarke (2000) record gifted students have a need to be "nurtured if they are to achieve at the level of which they are capable"

(p. 568) and the teacher plays a fundamental role in this nurturing.

In order to nurture gifted students Gagne (2007) suggests teachers need to acknowledge the "intensity levels within each type of gift" (p. 96). Also requiring consideration is the level of giftedness, for example, a teacher needs to develop an understanding of the relative rarity of an exceptionally or a profoundly gifted student and the ways in which their cognitive and affective needs are incrementally different to those of a moderately gifted student (Gross, 1993). Gagne also suggests many gifted programmes deal with the mildly to moderately gifted and the findings of this research indicate that modifications made to classroom teaching in mathematics and literacy may only be accommodating the needs of this group in primary school classrooms.

The teachers who participated in this research had an awareness of the diversity and dynamic nature of giftedness and used a variety of identification tools to 'find' their gifted students. However, many of the gifted students arrived in the classrooms already identified as gifted or at least were acknowledged to be those students who were demonstrating achievement or had the potential to achieve at a greater level than their same aged classmates. The research also highlighted the point that teachers can be reluctant to definitively say a student is gifted or to acknowledge just how gifted a student may be. However, despite not having in-depth knowledge about giftedness, teachers in this case study were observed to accommodate the different learning needs of their gifted students in a deliberate and professional manner.

Many student participants displayed 'school smart' behaviours in their classrooms - they were compliant and looked to be busy and engaged in learning. One of the most consistent findings from the study was while the gifted students often looked 'busy' in fact they could be doing nothing and were not being challenged educationally. While some gifted students wrote short stories or calculated mathematical equations closer inspection revealed they had often finished only what was required of them, were working on something other than the tasks they had been assigned, and often their products did not reflect what they could be capable of.

It became evident the pace at which gifted students can absorb new knowledge and skills was not significantly noticed by the teachers and there was a lot of 'down time', especially in ability group activities, where time was spent repeating tasks. This could be eliminated by teachers utilising options such as accelerative content and altering process, products, and learning environments to match the pace at which these students can actually learn. Kanevsky (1995) cites the most distinguishing characteristic of gifted students is related to the pace and nature of their learning and the findings of this research indicate even when they were learning new concepts, many of the gifted students felt the pace of the work was too slow and they were waiting for the others to catch up. This is illustrated by comments from the students such as:

I read fast and properly...correctly...when I wait for others to look up answers I get impatient...

More concentration from me if I didn't keep forgetting where everybody else was up to

It was apparent therefore that gifted students need teachers to acknowledge what they know and provide opportunities for them to show what they can achieve (Cathcart, 2006). In Susie's words:

I'm not a 'brainiac'... so I am not as good at maths as everyone else... I'm much better at writing and reading... but I could be even better if I could do more of that

2. How do teachers plan and utilise strategies for gifted students?

In New Zealand classrooms, teachers have students with different levels of readiness to learn and students who have differing skills with which to learn new material. For example, reading ages and the ability to comprehend text vary in any classroom. A gifted student may be able to read and understand texts which deal with difficult concepts while other students may be struggling to decode passages of text and answer simple questions. A teachers' role is to plan for these wide variations in the classroom using a variety of instructional techniques.

As Tomlinson (1995) records teachers need to 'organise' learning opportunities and in order for teachers to be able to organise learning opportunities for their students they rely on assessment. For example, results from standardised testing, asking questions, and

through analysis of students' products allow a teacher to identify a student's knowledge or skills in a particular curriculum area. It appears however, assessment often highlights only the deficiencies a gifted student may have and subsequent teaching and learning activities appear to be planned around these deficits. This is in contrast to the special learning needs of other students, where planning may be centred on what the student can do and moves forward from there. Even though educational literature (Clarke, 2008; Parke, 1989, Reis, 2001) emphasises the importance of the pace at which gifted students can learn and how quickly mastery of new content can be achieved, it was observed these factors were not often recognised in the classroom. For example, students may have needed to learn the features of a recount, but some students could have accomplished these skills in a shorter period of time, allowing more time for writing or exploring other writing genres.

Grouping was used extensively by all the teachers in this research, as a strategy to plan and teach programmes for gifted students. Based on diagnostic testing and teacher evaluations, the students were divided into groups and then the teaching content and processes were planned to deliver the mathematics or literacy curriculum. However, as Mc Grail (1998) suggests the pattern of grouping students should be based on unique needs allowing students to progress at their own pace. In this instance, Jack had a reading ability that far outstripped his peers, including the other gifted students in the classroom, and to accommodate his unique needs within the classroom he had an individualised reading programme. However, the teacher expressed concern at not being able to find suitable resources for Jack and acknowledged that for Jack, learning on his own was not always successful or even the best way to address his learning needs.

As Rogers (1993), Tomlinson (1995), and Van Tassel-Baska (1994) would agree, there is no one single solution to providing for gifted students in the regular classroom setting but the individualised reading programme represented what could be accomplished given that the time for Jack and the teacher to work one on one had to be balanced against the teacher's other classroom responsibilities. A partial solution therefore appears more

likely where teachers plan to use strategies that will best 'fit' the gifted student while still being cognisant of 'fitting' that student into the classroom setting.

The findings of this research identified the teaching and learning of mathematics and literacy in ability groups as the most common instructional strategy utilised by all three teachers. Planning revealed students were not always in the same group depending on the concepts being taught, so there was flexibility for students to belong to different groups depending on identified needs. However, when observed in groups, gifted students did not always stand out as the successful learner. Despite the fact their ability to comprehend often outstripped the content being studied by the group the gifted students had no way of being able to demonstrate superior knowledge when working within the confines of their 'ability' group.

This is once again a result of the differences between gifted students themselves not being acknowledged. For example, moderately gifted students, an IQ of 130-140, would have little in common with an exceptionally gifted child with an IQ of 160+ (Gagne, 2007; Gross, 1993). This is an important point to remember as the gifted students interviewed for this research reiterated many times that what went on in ability groups had some benefits, such as being with others and talking over ideas, but the reality for them as learners was they felt they were exposed to few opportunities to master new material and when material was new, they were restricted to learning at the same pace as others in the group.

The teachers used higher order thinking skills and open ended questioning techniques in group teaching sessions in both mathematics and literacy. Questions to be asked, recorded in the teacher's planning, demonstrated a commitment to delivering material of a challenging nature. However, as Van Tassel Baska (2004) records, the use of higher thinking models does not automatically result in classroom teaching which accelerates learning opportunities gifted students. The gifted students' responses support this statement and indicate the differentiation of the normal classroom programme might not be providing for their learning needs. Their responses included:

Schoolwork is easy... I can make it look hard so I have things to do
I usually know the answer but I don't always want everyone to know that
I would like to be Einstein...not really... but I could be if I could learn more
However, when Jack and Shirley worked together there was a competitive nature about the way they challenged each other. This suggests then, what is already known about gifted students working in ability groups from the meta analysis conducted by Kulik and Kulik (1992) to be true. Learning in ability group suits gifted students learning styles when the instruction and content challenges the gifted student through fast paced delivery and acknowledgement of the ability to master concepts quickly. In the three classrooms, the gifted students benefited from the cross groupings between classrooms for mathematics. This allowed the younger gifted students to interact with like minded instead of same-aged peers and the opportunity to work with concepts and skills at a faster pace contributing in some way to eliminating the repetition present in their own classroom groups. But still, the pace at which gifted students learned could have been accelerated and the content differentiated providing the gifted students with the challenge they indicated was missing from their mathematics learning.

3. How do classroom teachers modify instructional practices and curricular materials to meet the needs of gifted students?

As Rogers (1993) has suggested a 'one size fits all' approach to teaching and learning does not meet the needs of all students in a classroom setting and in particular cannot accommodate the diverse learning needs of gifted students. If these diverse learning needs are not met then students can become frustrated which can lead to a loss of self-esteem and ultimately to underachievement (Knight & Becker, 2000). As outlined by Gross (1999), if the curriculum presented to gifted students is based on their levels of ability then this curriculum is going to be beyond that of most of their classmates.

In New Zealand the " focus on student outcomes is reflected clearly in New Zealand's national curriculum, which articulates expectations of student achievement which are not 'locked' to age or year of schooling" (McDonough & Rutherford, 2004, p.1). Therefore the NZCF is flexible enough to allow students, who have already mastered what their

chronological peers are still learning, to move onto learning the curricula content appropriate to their ability.

Apparent from the classroom observations was that teachers modified their instructional practices and curricular materials to meet the needs of their gifted students using strategies such as recognising prior knowledge, providing enrichment activities, modeling higher order thinking skills, asking open ended questions, and individualised instruction. All three teachers modified their mathematics programme to cross group all the students from the three classrooms into ability groups giving opportunities for gifted students to interact with like minded peers for part of the school day.

One conclusion consistently supported by the literature is that flexibility is the key to accommodating gifted students' learning needs (Cathcart, 2006). The teacher in classroom three provided enrichment activities for her students gifted in literacy (Appendix10) and she also used a 'thumbs-up' strategy which allowed the students to excuse themselves from whole class or group instruction and continue with their own tasks. This flexibility afforded the gifted students choice in how they spent their time and what they worked on. However, a drawback to this was the way the gifted students then isolated themselves within the classroom by participating only in those activities they chose to do. Also, there was reliance by the teacher on the students' self evaluation of the activities to monitor progress.

Another example of flexibility was where a gifted student had his own independent project he could work on once he had demonstrated mastery of the task at hand. This allowed the gifted student the opportunity to pursue one of his 'passions. However, evaluation of his progress with this activity was again not closely monitored by the teacher. The participant's perspectives about the freedom and choice they had to engage in these activities were similar, but framed in different terms, for example:
Working on the grids is great...lots of time to be choosing what activities to do
Sometimes I like to move away when the rest are working something out but sometimes I stay because I have good ideas I want to give

I like having extra time to do the activities....they give me more time to be creative
Although the teacher clearly did not have a lot of time to monitor the 'extra' activities the gifted students were completing the gifted students had something other than regular classroom activities to work on. However, the level of content and skills, assessment of progress and the students' engagement in activities needed to established more clearly on the principles and practices of differentiation.

4. How do the strategies lead to differentiation of content, process, and products of classroom programmes?

Differentiation is when content, process, product and learning environments are altered to allow gifted students the opportunity to be able to work with content that is complex and abstract (Maker & Nielson, 1996; Tomlinson, 1995; Winebrenner, 2000). Differentiation also allows for students to work in ways suited to their learning styles, to be creating products reflecting their knowledge and understanding all within a learning environment which meets and sustains their learning needs. In this way, differentiation challenges gifted students by accelerating the content of what they are learning and by exposing gifted students to complexity, depth, and novelty in their classroom learning activities (Hunt, Kaplan, & Barkett, 1994). George (2005) suggests gifted students can feel challenged and successful when flexible grouping, appropriately challenging tasks, and an emphasis on how they learn, is part of their regular classroom programme.

The findings from this research suggest mathematics and literacy programmes were differentiated to some degree but the differentiation did not extend far enough to give the gifted students the challenge, choice, and flexibility they were looking for in their classrooms. Clarke (2008) outlines the cognitive needs of gifted students to include being exposed to new and challenging information in varied subjects and being allowed to pursue ideas and interests as far as they want to. When asked, the students wanted more time to keep writing, reading, or working on mathematical problems, but the structure of the classroom often prevented this from happening. Van Tassel-Baska and Stambaugh (2005) agree differentiation for gifted learners in the regular classroom setting requires "great skill on the part of teachers" (p. 216). For instance, teachers are required to

manage whole class instruction at the beginning of a new concept, followed by individual, small group work or whole group discussion with varied assignment tasks. Alternatively, teachers may choose a whole class approach to teaching a skill followed by students working on self-selected tasks and self evaluating their progress. While many of these strategies were used by the three teachers once again the students' perspectives reveal differentiation did not go far enough to avoid a repetition of skills and content they already knew or which they could master quickly.

5. How do teachers evaluate the effectiveness of the strategies they use to specifically target gifted students learning experiences?

The teachers evaluated the effectiveness of their teaching strategies through a variety of measures and approaches including comparing results from diagnostic tests, talking to the students about what they know, evaluating students' products, and having the students self evaluate their learning using success criteria. Pre-testing was used extensively in mathematics as was discussion in pairs and by asking students to articulate what they were doing and why. The teachers asked open ended questions drawing a variety of responses from the students and in this way the teachers were able to gauge the depth of understanding each student had about a particular concept or idea. However, the teachers did not take this further and ascertain what else the students may have known about the content being taught. As Van Tassel-Baska (1994) records, it remains to be determined which approaches are most effective under what circumstances with which gifted learners. This then makes it very difficult for teachers to determine what to use for each student and planning to meet gifted students' learning needs becomes a game of trial and error.

As already highlighted, gifted students come in many shapes and sizes and with many diverse characteristics and behaviours. What works for one may not be a strategy to use for others. Consequently, the teacher is continually revising and altering approaches and strategies. The teachers in this research were adept at monitoring what the gifted student responded to and gave them the opportunities to be engaged in learning best suited to their needs. For example, Bert writing his story directly onto the computer met his needs

in writing, Marco's teacher allowing him to opt in and out of group work to pursue his independent study, and Tania and George engaged in working on individualised activities.

Teachers assessed the effectiveness of these strategies by assessing the student products, and through observing the students' engagement in activities. However, what was apparent was while the teachers responded to the needs of their gifted students by modifying teaching approaches and including material and tasks designed to give their students a challenge, the real pace and depth at which these students could learn, as well as the diversity of abilities within the range of 'giftedness' was not easily acknowledged within these classroom settings.

6. How do students evaluate the effectiveness of strategies used by the teacher?

The central claim of this thesis is what happens to gifted students in the classroom is very much dependent on the role played by the teacher. However, the role of the teacher is dependent on many factors including the teacher's professional teaching experience, knowledge of gifted students, and the time and resources available to manage gifted students' learning experiences in the regular classroom setting. This research identified that no gifted student was unhappy with their teacher or displayed an unwillingness to come to school and engage in classroom activities or interact with their classmates.

The findings did establish however, a clear relationship between effective instructional strategies used by teachers and the learning undertaken by gifted students. The gifted students accepted they had to work in groups but the findings have consistently indicated given a choice, gifted students would only access group work if the pace, content, process, and products could be further differentiated to meet their real learning needs. It appears from these research findings that the gifted students did not need extensive whole class instruction and discussion but preferred to get on with a learning task. When modifications were made, such as individualised instruction, extension activities and the ability to opt out of group attendance, the students' responses were positive. As Betts (2004) records, students are discretionary learners and if they believe they do not need to

learn a specific point, they have a wish to move on, and they look to their teachers for guidance. Therefore teachers need to be competent and capable of providing the next learning step as well as recognising that for some gifted students the next learning step may be a giant leap.

Summary

The aims of this research were achieved in that the instructional strategies the teachers used were observed through their interactions with their gifted students and examined in light of the available literature in the field of gifted education. The students' views were determined through their interview responses and through the observed actions and responses in the classroom environment. The findings of this research found that many of the instructional strategies recommended in the gifted education literature as effective for gifted students were seen in the three classrooms. Three themes emerged from the gifted students' perspectives to suggest they require greater challenge, choice and flexibility in their learning. However, it was also apparent these gifted students were fully integrated and contributing members of their classroom environments and while their cognitive needs might not always have been met their affective needs were being nurtured. However, the literature informs us that effective teaching for gifted students involves sound teaching experience and practice as well as an empathy and understanding of giftedness.

The research literature also generated key ideas encompassing what gifted students really need from their teachers and from their classroom environment. Cathcart (2006) suggests gifted education cannot simply be a book of teaching strategies teachers use but instead teachers themselves need to have knowledge of giftedness and what this entails for classroom teaching. For gifted students it is not just about getting 'more', if 'more' is not differentiated to meet their real learning needs. Gifted education is about acknowledging a gifted student's learning achievements and providing them with a continuum of learning opportunities in their classroom. While gifted students want to be challenged, have choice, and flexibility in how they learn they also want to be engaged in learning

new knowledge. The themes emerging from the student interviews and from observations of the students in the classroom setting supported this. While the gifted students acknowledged what was being done for them and were aware of the modifications made for them by their teachers they indicated there was still some way to go before their learning needs were really being met. As one gifted student explained:
If it is beyond my knowledge then it is challenging... it almost never occurs in school!

The findings of this research suggest central to delivering effective teaching, is the role the teacher plays in providing for gifted students in regular classroom settings. Gifted students have distinct learning needs and there are often vast differences and diverse needs between gifted students themselves. In order for teachers to recognise a gifted student's needs, they must have knowledge of giftedness, training in providing learning and teaching experiences for gifted students, and the resources to be able to create learning opportunities for these students in the classroom environment. Gifted students also have a role to play and should be asked about what works best for them in the classroom setting. Arguably this may be more important than being asked how they used a particular strategy to solve a problem.

Chapter Six

Conclusions

The purpose of this research was to describe the strategies New Zealand primary school teachers use in their classrooms to provide for gifted students during mathematics and literacy teaching and learning. Data was gathered through a case study as this qualitative research approach allowed for a description and understanding of the topic to be determined. The selection of this research methodology was influenced by the research aims as well as by the researcher's own personal interest in gifted education. Three phases of information gathering were used; teacher interviews; classroom observations and document collection, and student interviews. The teacher interviews provided insight into their beliefs about giftedness and gifted education as well as identifying teaching practices. The student interviews provided data about gifted student's perceptions of teaching and learning in their classrooms. The observations highlighted the similarities that emerged in the ways the teachers defined, identified, and met the needs of the gifted students in their classrooms, despite these teacher participants possessing varying degrees of teaching experience and knowledge of giftedness.

From analysis of the data collected, common themes emerged in the instructional strategies teachers used to cater for their gifted students. These themes included:

- using assessment to gauge prior knowledge or mastery,
- sharing learning goals,
- ability grouping for instruction,
- individualised instruction,
- opportunities to work with like minded peers,
- enrichment activities,

- utilising higher order thinking skills,
- addressing different modes of learning,
- self evaluation by students, and
- providing a learner centred environment.

From these teaching themes, the students' perspectives were analysed and three student themes of challenge, choice, and flexibility emerged. These latter themes relate to the literature which suggests gifted students need programmes of teaching and learning incorporating these three concepts. In meeting the dynamic learning needs of gifted students the role of the teacher is of utmost importance to the effectiveness of programmes and learning opportunities.

Watching and listening to interactions in the classrooms provided me with an opportunity to examine how gifted students in primary school classrooms spend their day. It is apparent giftedness is a difficult construct to define and there are still many unanswered questions for teachers to resolve about how to cater for gifted students in the classroom. As Johnsen et al (2002) record, changing what happens in the classroom context is a "complex, slow process' (p. 46) and transformational changes such as resources, professional development, and support for teachers need to be addressed. In the New Zealand context teachers could consider providing innovative ways to deliver the curriculum to their gifted students.

In searching for answers to the research question, key findings emerged providing data for analysis. The three participating classroom teachers were at different stages in their knowledge of gifted students and in their experience of instructional strategies that could be utilised to cater for gifted students within their classrooms. While this research does not endorse these teachers' classroom practices as 'excellence' in the teaching of gifted students, each demonstrated they were making a conscious and professional effort to facilitate the learning experiences of their gifted students. In conducting the research, ideas for the teaching of gifted students in regular classrooms, the strategies used, and the effort required by classroom teachers became evident. However, what also becomes

apparent is despite the best efforts of these classroom teachers their gifted students were still left 'wanting more' differentiated programmes.

Reflections on the Use of the Classroom Observation Focus

The use of the Classroom Observation Focus highlighted the teaching strategies used within the regular classroom setting. I found using a structured observation tool enabled a more accurate interpretation and analysis of the teacher's actions in light of current gifted educational views about what is effective teaching for gifted students. The observation focus also aided the formulation of the student interview questions as I was able to clearly identify the teaching strategies and the resultant student behaviour and discuss these elements with the students.

Research Limitations

Four key limitations to this research exist. Firstly, the small number of participants could contribute to the findings being biased. This small sample size of three teachers and twelve participants could produce findings which are too narrow to afford individual differences between the participants to be interpreted.

The use of the Classroom Observation Tool could be considered a limitation if the constructs it was identifying did not reliably and accurately measure the teaching strategies effective for gifted students. To address these concerns, I determined from a variety of sources the teaching strategies most likely to be viewed in the regular classroom. In this way there was more opportunity for the strategies to be observed and their effects on student learning behaviours to be described.

Another limitation is the potential existence of researcher observer effects which may have been an influence on the teacher's planning or the teacher's and student actions and interactions within the classroom setting. This is recognised in this research and it may affect attempts to generalise the findings to other classrooms.

Generalisability to other classrooms is however also limited given the uniqueness of school, the classrooms, and the participants themselves. The intent of the study was not to generalise but to establish transferability. By providing a description of the setting and the events, the reader can determine whether the same findings could be expected under similar circumstances in similar settings. In addition to the restrictions of a single site, the age of the student participants and the number of students within the classrooms may also be factors to consider in interpreting the findings.

Contributions of the Research

Braggett and Moltzen (2000) suggest considerable attention should be focused on regular classroom teachers and gifted students interactions as this is where many gifted students are provided with an educational future that meets their unique and specific learning needs. It is also important to note this context is where New Zealand gifted students spend much of their school day. While this scenario may be the ideal, it does not recognise the demands placed on classroom teachers in New Zealand primary schools.

Within the New Zealand primary school context, options to cater for the learning needs of gifted students are to a large degree dependent on schools developing gifted education policies that set out how to define, identify, and provide for their gifted students. This research would assist readers who are interested in gifted education and the effect of pedagogy on provisions for gifted students in primary school classrooms.

Implications for Teaching Mathematics and Literacy to Gifted Students in the Regular Classroom

This case study provided insight into the classroom interactions between gifted students and their teachers. As previously noted, mathematics and literacy are areas where teachers can readily identify their gifted students, especially through standardised testing, Numeracy Project strategy testing and diagnostic tests. Important too, is that teachers consider identification tools such as those used by the three teachers in this research to 'find' their gifted students. The students in this research may not reflect a 'typical' mix of gifted students found in classroom settings but they do provide an example of the many

and varied characteristics and behaviours of gifted students. They also illustrate while there may be more than one gifted student in any one classroom they may have little in common with each other and will not easily be grouped together in a homogenous group. Important also is that the gifted student may not be the 'successful school smart learner' in the classroom.

This research highlights the difficulty teachers have in determining the strategies to use to provide a differentiated programme in mathematics and literacy. The strategies outlined in this research may contribute to a teacher's understanding of the instructional strategies available, and more importantly, may provide an insight into the benefits to be gained from asking the gifted student what they need and how the processes and strategies used in the classroom meet their learning needs.

Recommendations for Teaching Mathematics and Literacy to Gifted Students in Regular Primary School Classrooms

Gifted students have different learning needs which set them apart from their same aged peers as well as from other gifted students. In essence gifted students differ in the pace and the depth at which they may like to learn, in the interests they hold, as well as being qualitatively different from each other (Clark, 2008). The students in this research encompassed these three concepts; they were as similar to each other as they were different and the consequences of this for teachers to plan and implement programmes are challenging and varied.

The gifted students in this research were in classrooms where the teachers were aware they were gifted and who attempted to meet these students' needs in a variety of ways, while also attending to the learning needs of the other students in the classroom. The recommendations generated from this research include teachers finding ways to accommodate gifted students in their regular classrooms by providing challenge, choice, and flexibility in the teaching and learning experiences they provide for gifted students. Recommendations to achieve this are:

- a greater focus on what gifted students can do and less on the deficits they may have,
- acknowledging gifted students have the ability to master concepts more quickly and may only need a 'just in time' approach to skills teaching,
- acceleration of content and fast pace of delivery to challenge and extend gifted students' knowledge,
- flexible group membership with movement between groups as concepts are mastered,
- less time in mixed ability groups, co-operative groups, and whole class instruction,
- more time to work with like minded peers or on independent learning tasks,
- asking students what they want, what they think, how they best like to learn, and their perceptions of themselves as learners,
- effective professional development opportunities for teachers in gifted education, and
- school-wide structures to be put in place that support and sustain gifted education.

Future Research

Future research could take into consideration the limitations of this study previously outlined in Chapter Five. For example, the sample size in this research was small in the numbers of participating teachers and the single site. Future research could expand this study to include a greater number of teachers in different schools across New Zealand or with other year groups not included in this research. Such research may afford the opportunity to analyse similarities and differences of effective teaching strategies. Alternatively, further research could include the perspectives of the parents.

Ethnic and cultural factors were not considered in this research and it may be useful for any future study to find ways that would incorporate these factors into a study. For example, it was noticed students were influenced by their parents and caregivers and cultural backgrounds. When asked about what they knew but could not show in class many of the students replied they were taught at home, taught themselves, or were encouraged to engage in academic pursuits under parental guidance. Gender influences were also not considered in these research findings but future research could determine the extent to which teachers' perceptions of giftedness and subsequent classroom learning

opportunities are shaped by the gender of gifted students. In this case study, the teachers were a major influence in determining the instructional strategies used to teach gifted students. Future research could include action research by teachers to discover the teaching strategies they use that best meet the needs of their gifted students.

Final Comments

This study highlights the important and valued role the teacher plays in providing quality teaching to gifted students in regular classrooms. It is not enough to just acknowledge gifted students, but it is also important to cater for their dynamic and diverse behaviours and their unique learning needs. The purpose of education is to educate by teaching the processes of learning to students so they can become self-regulated learners. In the case of gifted students, however, it becomes important their potential to succeed is cultivated in ways matching their diverse learning needs. Gifted students in the regular classroom require teachers who create opportunities for them to follow their passions and interests and who can teach them the skills they need to become successful learners. In the New Zealand educational context, teachers need to recognise and value the contribution they can make to their gifted students cognitive and affective well being.

Teaching gifted students in the New Zealand primary school classroom setting can be challenging, involving resources and professional knowledge of giftedness as well as knowledge of effective teaching strategies. Time can be a barrier when busy classroom teachers need to fully understand and cater for their gifted students' diverse cognitive and affective needs. The role of the classroom teacher however is pivotal and the teachers in this research manage their gifted students within the limits that time, resources, and their own knowledge of giftedness and gifted education impose. These teachers are special because they have acknowledged their gifted students and are prepared to find ways to provide appropriate learning experiences for them within their classrooms. That gifted students want more depth, complexity, and challenge in their classrooms is an indication they are in a learning environment in which they feel supported and confident to 'ask for more'.

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Appendices

Appendix 1 Classroom Observation Focus

Teacher:		**Targeted Student/s:**
Mathematics **Literacy** **(Circle)**		
Date:		**Time: Start**
End		
The Teacher		**Descriptive Notes**
Planning Assessment Based Grouping Gifted Students Learning Needs- prior knowledge/ mastery acknowledged Challenge Choice Higher thinking tools Interdisciplinary links		
Expectations for Learners Clear directions and instructions for activities Flexible in altering basic framework as lessons progress High expectations for student performance Clear and consistent feedback on student performance		
Differentiation **Looking For: Content** Curriculum compacting-move through basic materials more quickly In depth in learning emphasised Acceleration Complexity Abstract Range of materials		

Differentiation **Looking For-Processes** Addresses different modes of learning (visual-auditory-kinesthetic) Demonstrating, modeling, explaining Whole class instruction Ability Group instruction Partner activities Individual instruction Individual/ independent activities Learning contracts Opportunities to work with like minded peers Higher thinking skills/ Questioning open-ended Timing and pace of activities Learning centres Independent activities Choice of activities Use of technology		
Differentiation **Looking For-Product** Range of tasks Opportunities for creativity Ways to share learning		
Differentiation **Looking for-Learning Environment** Learner centred Independence emphasised Flexible grouping –mobility between groups Flexible structure of classroom		

Gifted Students		
Name:		
Name:		
Name:		
Reflective Notes		

Appendix 2 Observation Timetables

Observation/Interview Timetable Classroom One August 2007					
Week 4	Monday 6	Tuesday 7	Wednesday 8	Thursday 9	Friday 10
9.30-10.30	Teacher interviewed 25 July			Maths	Maths
10.50-12.30	Look at records archival data on students			Literacy	Literacy
Week 5	Monday 13	Tuesday 14	Wednesday 15	Thursday 16	Friday 17
9.30-10.30		Maths		Maths	Maths
10.50-12.30		Literacy		Literacy	Literacy
Week 6	Monday 20	Tuesday 21	Wednesday 22	Thursday 23	Friday 24
9.30-10.30		Maths			
10.50-12.30					Literacy
Week 7	Monday 27	Tuesday 28	Wednesday 29	Thursday 30	Friday 31
9.30-10.30				Interview students	Interview students
10.50-12.30					

Observation/Interview Timetable Classroom Two August/September 2007					
Week	**Monday 27**	**Tuesday 28**	**Wednesday 29**	**Thursday 30**	**Friday 31**
9.30-10.30	**Teacher interviewed 21 August**		**Look at records archival data on students**		**Maths**
10.50-12.30					**Literacy**
Week	**Monday 3**	**Tuesday 4**	**Wednesday 5**	**Thursday 6**	**Friday 7**
9.30-10.30			**Maths**	**Maths**	**Maths**
10.50-12.30			**Literacy**	**Literacy**	**Literacy**
Week	**Monday 10**	**Tuesday 11**	**Wednesday 12**	**Thursday 13**	**Friday 14**
9.30-10.30			**Maths**	**Maths**	
10.50-12.30			**Literacy**		**Literacy**
Week	**Monday 17**	**Tuesday 18**	**Wednesday 19**	**Thursday 20**	**Friday 21**
9.30-10.30			**Interview students**	**Interview students**	
10.50-12.30					

Observation/Interview Timetable Classroom Three October/November 2007					
Week 1	Monday 8	Tuesday 9	Wednesday 10	Thursday 11	Friday 12
9.30-10.30	Teacher Interviewed Thursday October 4		Look at records archival data on students		Maths
10.50-12.30					Literacy
Week 2	Monday 15	Tuesday 16	Wednesday 17	Thursday 18	Friday 19
9.30-10.30			Maths	Maths	Maths
10.50-12.30			Literacy		Literacy
Week 3	Monday 22	Tuesday 23	Wednesday 24	Thursday 25	Friday 26
9.30-10.30			Maths	Maths	
10.50-12.30			Literacy		Literacy
Week 4	Monday 29	Tuesday 30	Wednesday 31	Thursday 1	Friday 2
9.30-10.30				Interview students	Interview students
10.50-12.30			Literacy		

Appendix 3 Teacher Letter and Consent Form

Katherine Lilley

Dear

Although we have spoken informally, this is a formal request for me to undertake research on gifted children as part fulfillment of my Masters Degree in Education in your classroom. The purpose of the research is to understand and explain what teachers do in their classrooms to provide effectively for gifted students in Mathematics and Literacy. The information collected is not to make judgments or assessments but should be viewed as a means to inform teaching practice.

I would like to observe you and your students within your classroom context. It is envisioned that observations would be in two phases, one to establish strategies that you use in Literacy and Numeracy, and the second phase to watch the effect of one or more of those strategies for the gifted students in your classroom. At the conclusion of the observations you will be asked to complete a questionnaire and subsequently be interviewed by me. The observations will take approximately six hours and the interview approximately one hour. I would also ask to have access to documents such as classroom planning diaries. I would then like to interview selected gifted students from your classroom after obtaining informed consent of their parent/s or caregiver/s. Anonymity and confidentiality of all information would be assured and you and your students will not be identified.

I have included an information sheet which outlines the research and gives contact details of my supervisors. I have also included a consent form. It would be appreciated if the consent form could be returned in the envelope provided.

If you have any concerns or questions regarding this research please feel free to contact me.
Thank you for your time and assistance.

Sincerely,

K. Lilley

Teaching Strategies for Gifted Students in Mathematics and Literacy: A Case Study in a New Zealand Primary School - undertaken by Katherine Lilley

Consent Form

I have read the Information Sheet and have had the details of the study explained to me. My questions have been answered to my satisfaction, and I understand that I may ask further questions at any time.

I understand I have the right to withdraw from the study at anytime and to decline to answer any particular question.

I agree to provide information to the researcher on the understanding that my name will not appear without my permission. This information will be used only for this research project.

I agree to participate in this study under the conditions set out in the Information Sheet.

Signed .....
Name .....
Date .....

Appendix 4 Information Sheet for Teachers

Information Sheet

Teaching Strategies for Gifted Students in Mathematics and Literacy: A Case Study in a New Zealand Primary School

Please ensure you have read this sheet fully before signing the consent form.

I am Katherine Lilley, a student at Massey University, and this research is intended for the purpose of completing a thesis report as part of a Master of Education (Gifted and Talented).

My contact details are:
Katherine Lilley
PH: 4795562
58 Amapur Drive
Khandallah
Wellington
Email: kay.nomad@gmail.com

The supervisors for this project are
Dr Tracy Riley
Massey University Private Bag 11-222
Palmerston North
Phone 06-356 9099 extn 8625
Email: T.L.Riley@massey.ac.nz

Brenda Bicknell
Massey University Private Bag 11-222
Palmerston North
Phone 06-356 9099 extn 8862
Email: B.A. Bicknell@massey.ac.nz

Purpose and Rationale of the Research
In New Zealand gifted students are an understudied population. Much of the research covering giftedness and gifted education has emanated from the North American, English or Australian experiences and these perspectives, while not to be discounted, are not necessarily focused to determine appropriate teaching practice in the New Zealand educational context. Some research already conducted into what happens to gifted students in New Zealand primary schools focuses more on school-wide provisions and there is not yet a clear understanding of the provisions that teachers make in their classrooms for these students. Consequently there is a knowledge gap about the reality for the teacher of having a gifted student in their classroom and the reality for a gifted student in the classroom context.

Objectives
By using a case study approach of classroom observations, questionnaires, and interviews it is intended that this research will explain the strategies utilised by teachers to implement Numeracy and Literacy programmes for gifted students in the regular classroom environment.

The specific research objectives are:

- To identify and explain types of Numeracy and Literacy strategies used by teachers to cater for a gifted student/s educational needs,
- To determine successful strategies used in Numeracy and Literacy,
- To determine if strategies used in Numeracy and Literacy are common to the teachers in the syndicate,
- To elicit teachers perceptions of strategies used in Numeracy and Literacy and the perceived successfulness of those strategies,
- To elicit gifted students perceptions of strategies used by their teachers during Numeracy and Literacy and their perceived usefulness of these strategies

Research Questions

- What strategies do New Zealand primary school teachers use in their classrooms (Year 4, Year 5 and Year Six) to provide teaching and learning experiences in Numeracy and Literacy that cater for the identified needs of a gifted student?
- What do teachers need to 'know' about gifted students so they can identify strategies to use to meet that student's needs?
- How do teachers plan and utilise strategies for gifted students in Numeracy and Literacy?
- How do classroom teachers modify instructional practices and curricular materials to meet the needs of gifted students in Numeracy and Literacy?
- How do the strategies used in Numeracy and Literacy lead to differentiation of content, process, product of classroom programmes?

Participant Recruitment

For the purpose of this case study a New Zealand primary school in the Wellington area has been pre-selected by the researcher and agreement to allow research to be undertaken at this school will be obtained from the Principal, the teachers who would be involved, and the Board of Trustees. Upon informed consent, identified gifted student participants and the teacher participants will be observed in their classroom context and questionnaires and interviews of both teachers and student participants will take place. The number of participants will be determined by the identification processes and only those students identified as gifted will be interviewed upon informed consent of the parents/caregivers.

Project Procedures

The data obtained from observations, interviews, archival documents and questionnaire responses will be analysed to look for themes, trends and patterns that may explain what happens in the classroom. The actions of teachers would be analysed for comparison and similarities and interview transcripts reduced to key words and phrases. Transcribed field notes from observations will be read, numbered, and coded indicating the classroom and the data collection technique for example interview, archival document, observation, or questionnaire. The dating of data would apply to documents gathered as much will have been written before the research commenced for example long term planning documents and lesson plans. All data obtained will be coded to ensure anonymity and confidentiality of those involved and names and identifying symbols will be deleted or obscured from all documents with participants identified using a code known only to the researcher. Data will be stored in a safe in the researcher's private home and data stored on the researcher's private laptop will be password protected. At the conclusion of the research, data will be deleted and shredded as appropriate. A summary of the project findings will be available from the researcher.

Participant involvement

It is envisioned that the observations of teachers and identified gifted students within the classroom context will would consist of three sessions of Numeracy and three sessions of Literacy per teacher resulting in approximately 18 hours of observations in two distinct phases. Phase one would be to establish the strategies used by the teachers using a pre-designed observation focus. Phase Two would be to observe the effects of a particular strategy. Viewing teacher documentation of planning would be allocated 6 hours. The

questionnaire and interview and feedback time for teachers will take approximately one hour. Interviews of selected students would be up to an hour each.

Participant's Rights
All participants have:
The right to decline to participate
The right to refuse to answer any particular questions
The right to withdraw from the study at any time
The right to ask questions about the study at any time during
The right to provide information on the understanding that your name will not be used
The right to access a summary of the findings of the research upon its conclusion

This project has been evaluated by peer review and judged to be low risk. Consequently, it has not been reviewed by one of the University's Human Ethics Committees. The researcher named above is responsible for the ethical conduct of this research.

If you have any concerns about the conduct of this research that you wish to raise with someone other than the researcher(s), please contact

Professor Sylvia Rumball,

Assistant to the Vice-Chancellor (Ethics & Equity),

Telephone 06 350 5249,

email humanethics@massey.ac.nz

Appendix 5 Letter and Information Sheets for Parents / Caregivers and Students

Katherine Lilley (B. Ed)

Dear.....

I am Katherine Lilley, a student at Massey University, and I am undertaking research about gifted education for the purpose of completing a thesis report as part of a Master of Education. As part of this research I would like to observe .....within his/her classroom context during Mathematics and Literacy sessions. It is envisioned that these observations will take approximately six hours. At the conclusion of the observations I may choose to interview ... to talk about the ways he/she likes to learn. Anonymity and confidentiality of all information would be assured and your child's name will not be identified.

I have included an information sheet which outlines the research and gives contact details of my supervisors. I have also included a consent form. It would be appreciated if the consent form could be returned in the envelope provided.

If you have any concerns or questions regarding this research please feel free to contact me or one of my supervisors.

Thank you for your time and assistance.

Sincerely,

K. Lilley

Classroom Teaching Strategies for Gifted Students in Mathematics and Literacy: A Case Study in a New Zealand Primary School Syndicate

Participant Consent Form

I have read the Information Sheet and have had the details of the study explained to me. My questions have been answered to my satisfaction and I understand that I may ask further questions at any time.

I understand I have the right to withdraw from the study at anytime and to decline to answer any particular question.

I agree to provide information to the researcher on the understanding that this information will be used only for this research project and that my name will not appear in the research findings.

I agree to participate in this study under the conditions set out in the Information Sheet.

Parent Signature:..... Date: .....

Parent Name - printed.....

Student Signature: ..... Date: .....

Student Name - printed:..... Date: .....

This consent form will be kept for the duration of the study.

Information Sheet

Classroom Teaching Strategies for Gifted Students in Literacy and Numeracy: A Case Study in a New Zealand Primary School Syndicate

Please ensure you have read this sheet fully before signing the consent form.

I am Katherine Lilley, a student at Massey University, and this research is intended for the purpose of completing a thesis report as part of a Master of Education (Gifted and Talented). My contact details are:
Katherine Lilley
PH: 4795562
58 Amapur Drive
Khandallah
Wellington
Email: kay.nomad@gmail.com

The supervisors for this project are
Dr Tracy Riley
Massey University Private Bag 11-222
Palmerston North
Phone 06-356 9099 extn 8625
Email: T.L.Riley@massey.ac.nz

Brenda Bicknell
Massey University Private Bag 11-222
Palmerston North
Phone 06-356 9099 extn 8862
Email: B.A. Bicknell@massey.ac.nz

Purpose and Rationale of the Research
In New Zealand gifted students are an understudied population. Much of the research covering giftedness and gifted education has emanated from the North American, English or Australian experiences and these perspectives, while not to be discounted, are not necessarily focused to determine appropriate teaching practice in the New Zealand educational context. Some research already conducted into what happens to gifted students in New Zealand primary schools focuses more on school-wide provisions and there is not yet a clear understanding of the provisions that teachers make in their classrooms for these students. Consequently there is a knowledge gap about the reality for the teacher of having a gifted student in their classroom and the reality for a gifted student in the classroom context.

Objectives
By using a case study approach of classroom observations, questionnaires, and interviews it is intended that this research will explain the strategies utilised by teachers to implement Numeracy and Literacy programmes for gifted students in the regular classroom environment.

The specific research objectives are:
- To identify and explain types of Numeracy and Literacy strategies used by teachers to cater for a gifted student/s educational needs,
- To determine successful strategies used in Numeracy and Literacy,
- To determine if strategies used in Numeracy and Literacy are common to the teachers in the syndicate,
- To elicit teachers perceptions of strategies used in Numeracy and Literacy and the perceived successfulness of those strategies,
- To elicit gifted students perceptions of strategies used by their teachers during Numeracy and Literacy and their perceived usefulness of these strategies

Research Questions

- What strategies do New Zealand primary school teachers use in their classrooms (Year 4, Year 5 and Year Six) to provide teaching and learning experiences in Numeracy and Literacy that cater for the identified needs of a gifted student?
- What do teachers need to 'know' about gifted students so they can identify strategies to use to meet that student's needs?
- How do teachers plan and utilise strategies for gifted students in Numeracy and Literacy?
- How do classroom teachers modify instructional practices and curricular materials to meet the needs of gifted students in Numeracy and Literacy?
- How do the strategies used in Numeracy and Literacy lead to differentiation of content, process, product of classroom programmes?

The Participants

For the purpose of this case study a primary school in the Wellington area has been pre-selected by the researcher and agreement to allow research to be undertaken at this school will be obtained from the Principal, the teachers who would be involved, and the Board of Trustees. Upon informed consent, identified gifted student participants and the teacher participants will be observed in their classroom context and questionnaires and interviews of both teachers and student participants will take place. The number of participants will be determined by the identification processes and only those students identified as gifted will be interviewed upon informed consent of the parents/caregivers.

The Participants role within the research

It is envisioned that the observations of teachers and identified gifted students within the classroom context will would consist of three sessions of Numeracy and three sessions of Literacy per teacher resulting in approximately 18 hours of observations in two distinct phases. Phase one would be to establish the strategies used by the teachers using a pre-designed observation focus. Phase Two would be to observe the effects of a particular strategy. Teachers will then be asked to complete a questionnaire and subsequently interviewed by the researcher. Interviews will take approximately one hour and interviews of selected gifted students would take approximately thirty minutes.

Participant's Rights

All participants have:
The right to decline to participate
The right to refuse to answer any particular questions
The right to withdraw from the study at any time
The right to ask questions about the study at any time during
The right to provide information on the understanding that your name will not be used
The right to access a summary of the findings of the research upon its conclusion

This project has been evaluated by peer review and judged to be low risk. Consequently, it has not been reviewed by one of the University's Human Ethics Committees. The researcher named above is responsible for the ethical conduct of this research.

If you have any concerns about the conduct of this research that you wish to raise with someone other than the researcher(s), please contact
Professor Sylvia Rumball,
Assistant to the Vice-Chancellor (Ethics & Equity),
Telephone 06 350 5249,
email humanethics@massey.ac.nz

K. Lilley

Appendix 6 Identification Strategies Used by the School

Identification strategies used included:

- Progressive Achievement Tests (PAT),
- Standardised Test for the Assessment of Reading (STAR),
- overseas competition results,
- running records,
- anecdotal notes including past and present knowledge of the students by teachers,
- student portfolios containing past and present achievements and products,
- Assessment Tools for Teaching and Learning (asTTle),
- Numeracy testing,
- teacher checklists of gifted characteristics and learning behaviours,
- parent, student and peer nomination forms, and
- information from parents.

Appendix 7 Teacher Interview Questions

Background Information
How long have you been teaching?

Where were you trained?

What age groups have you taught?

Rationale for teaching
How do you see your role as the teacher?

What is your philosophy about teaching and learning?

How do you define gifted students in your school/classroom?

How do you identify gifted students in your school/classroom?

What type of programmes for gifted students are you consciously promoting in your classroom?

Do you think providing a differentiated programme of teaching and learning for gifted that gifted students is valuable? (Why/How)

Your Role in Providing for Gifted Students in Mathematics and Literacy
Please describe the specific strategies you use in Literacy to meet the needs of gifted students in your classroom?

How do you assess the effectiveness of the strategies you utilise in Literacy? What strategies are successful and why do you think this is so.

Please describe the specific strategies you use in Numeracy to meet the needs of gifted students in your classroom?

How do you assess the effectiveness of the strategies you utilise in Numeracy? What strategies are successful and why do you think this is so.

What type of classroom management tools do you utilise for gifted students?

Formative Influences on your teaching
What kind of support have you had to develop provisions for gifted students-school wide approach, personal professional development)?

Has your school undertaken any type of contract you think has helped to promote strategies for gifted students in Literacy or Numeracy?

Are there any programmes or authors that you find particularly helpful when planning for gifted students?

Are there any obstacles preventing you from teaching/planning to teach gifted students in Literacy?

Are there any obstacles preventing you from teaching/planning to teach gifted students in Numeracy?

Are there any concerns about the classroom observations?
(I will give you a copy of the observation focus before I begin).

Which gifted students would be best to observe in your classroom?
(I will then send the parents information sheets and consent forms).

Can I have a copy of relevant information about the gifted student-examples of the identification process test results, classroom notes etc

Can we finalise some observation times?

Is it possible for me to obtain a copy of the planning at the time of each classroom observation? The first observation will focus on teaching strategies and subsequent observations will focus on the gifted student's responses.

Is there anything you would like to discuss about the questions I have asked?

Appendix 8 Student Interview Questions

Mathematics
What do you like best about Mathematics?
How do you feel about working in groups for Mathematics?
How do you choose a partner to work with on task board activities?
What would you like to change about working in groups?
Do you feel challenged by the questions the teacher asks you in small group work?
How do you feel when you are asked to justify/explain your answers or how you arrived at an answer?
Do you always know the answer? What happens when you do? What happens when you do not know the answer?
What do you feel/ do when you do not know the answer?
Do you always have to move on to a new activity when the buzzer sounds?
What do you understand about Mathematics but cannot show in class?
If you wanted to, what could you change about how you learn Mathematics at school?
Literacy - Reading
When the teacher asks you to work in groups for reading how does this match the way you like to learn?
Which task board activities do you enjoy the most and why?
What writing activities would you like to spend more time doing?
When you are working on the worksheets what are you learning?
Do you feel challenged by the questions the teacher asks you in small group work?
Do you always have to move on to a new activity when the buzzer sounds?
What reading activities would you like to spend more time doing?
What do you understand about Reading but cannot show in class?
If you wanted to, what could you change about how you learn Reading at school?
Writing
What do you gain from whole class instruction?
What are you doing when you critique others writing?
What writing activities would you like to spend more time doing?
What do you understand about writing but cannot show in class?
If you wanted to, what could you change about how you learn writing at school?
General
Which instruction strategy do you prefer-whole class, group, individual?
What is good and bad about working in groups?
Are you learning new things at school? Is schoolwork easy for you?
What do think the teacher expects of you as a learner in the classroom?
Is there anything you would like to ask me?

Appendix 9 Success Criteria

Short Story Writing

Please highlight two of these success criteria that you think you have done really well. Then highlight your writing where you think that you have done these success criteria really well. Finally: write what you think your next step is in your writing

.

1. Use the correct format for a short story. (opening, build up, dilemma, events and resolution).
2. Use 'show; don't tell' to let the reader know the setting and characters and in other parts of the story.
3. Use strong, precise language to create a good picture in the reader's mind.
4. Include senses, feelings, and reactions.
5. Use dialogue in the story.
6. Use paragraphs to show a change in ideas.
7. Use VCOP to rework your writing to improve the quality of it.

Teacher's comments:

My next step:

Appendix 10 Tic Tac Toe Activities

Choose four of these activities to do during reading time. Shade the ones you have completed and have your work ready to show me.

Silent Reading **Complete two sessions of 20 minutes silent reading** **Session 1** **Book**_____ **Session 2** **Book**_____	**FREE CHOICE**	**Computer** Go onto students on Samba and under the reading websites Spend thirty minutes working on one two of the activities. Save what you have done so I can mark your work and see what you have been doing.
Choose a story from your independent reading box See if you can write a play or short story about the story you have selected. If there is time you could perform the play for the class In your reading box there are examples of plays to help you.	**Choose a story you have read recently that you have really enjoyed.** **Design a new and exciting book cover for the book.** **You may need to do a draft copy first** **You can use the computer or paper from the art bay.**	**Posters** Look through some of the magazines in the art bay. Choose one advertisement. Think about the following and write your thought in your reading book. What is the advertisement selling? Who is the advertisement aimed at? How do you know this? Do you think this advertisement would make people buy this product? Why? What do you notice about the use of shapes and colours etc.