Explorations of Year 6 to Year 7 Transition in Numeracy

Brenda Bicknell
Massey University
<b.a.bicknell@massey.ac.nz>

Roberta Hunter
Massey University
<r.hunter@massey.ac.nz>

This paper reports on school transition systems and practices in numeracy when students move from one type of school to another between years 6 and 7. The study used multiple case studies across six primary schools, three intermediate schools, and one middle school in two different geographic regions. Qualitative data (from interviews and questionnaires) was collected from students, teachers, lead teachers in numeracy, and parents. The data was analysed using a conceptual framework for examining transition. The first phase included 67 year 6 students; from this group, six students were selected for phase two in year 7 on the basis of being gifted and talented and ten based on Māori and Pasifika ethnicity. The study was concerned with these two particular groups of students because they do not always make the transition easily. Findings showed that the transition process from year 6 to year 7 was not problematic for most of the students. The gifted and talented students had all completed a successful move. The move had not been so smooth for some of the Māori and Pasifika students, who were still, at this early stage, making adjustments to their new class setting. In numeracy, there was evidence of "fresh-start" practices that included numeracy reassessments, a lack of curriculum continuity, and mistrust between sectors.

Introduction

The move from one type of school in the education system to another type of school is often described as transition. For most New Zealand students, an example of this is the move from year 6 (primary school) to year 7 (which may be to an intermediate[1], a year 7–13, or a middle school[2]). The move from one school to another is a very important occasion in a student's schooling and, at the ages in this study, often coincides with the onset of adolescence. The transition from primary to intermediate[3] school is viewed almost as a rite of passage. It is an interim move that may challenge students personally, socially, and academically, and also structurally in relation to the way their new school is organised. The intermediate school provides a model that combines aspects of primary school along with some of the subject specialisation, streaming, and timetabling practised in secondary school.

A transition may present many challenges for students. These include: difficulties with sustaining commitments to learning and in understanding the continuities in learning (Anderson, Jacobs, Schramm, & Splittgerber, 2000; Demetriou, Goalen, & Rudduck, 2000); lack of continuity of teaching style; and changes in teacher expectations, friendships, and subject matter. There is also the practice of schools adopting a "fresh start" policy (Galton & Hargreaves, 2002), in which those schools receiving new students fail to consider the academic information passed on by the students' previous schools (in this study, the primary schools). The justification for this practice is the belief by schools at the next level that they are better equipped to make judgments about students' abilities in subject areas such as mathematics because they have more academically-specific knowledge. This means that written records are mistrusted, although, according to Fabian (2007), communication systems contribute an important role in effective management to "make a transition meaningful to everyone" (p. 10).

Consistent research findings from both the United Kingdom and the United States provide evidence of dips in student progress at each point in transition, such as primary to middle school or middle to junior high (Anderson, et al., 2000; Galton & Morrison, 2000). Noyes (2006) showed that, in mathematics, school transition acted like a prism diffracting the social and academic trajectories

[1] Year 7 and 8 classes only

[2] Years 7–10

[3] Intermediate, in this paper, includes the middle school concept.

of students as they passed through it. Galton, Morrison, and Pell (2000) explained that, although students often showed signs of anxiety and excitement at the prospect of moving to a new school (often a much larger school), for the majority of students, any fears had largely disappeared after the first term. Typically, what remained was a lack of continuity across the curriculum. Other studies showed that students were often presented with revision of material previously encountered and a lower level of task demand that led to boredom, lack of motivation (Anderman & Maeher, 1994), disengagement from school (Anderson et al., 2000), and dips in progress (Catterall, 1998). The research on transition does not at this stage indicate whether such dips in progress are cumulative, so there is a need for more longitudinal studies. Recent New Zealand research (Cox & Kennedy, 2008) on transition from primary to secondary schooling found that by the end of the first year at secondary school, most students made good achievement gains in mathematics, although there was a marked drop in positive attitudes towards this subject (including in high achievers).

Students may be supported in their school transitions in a variety of ways. This support may be systemic (for example, school visits and written material) or provided by people such as friends and peers, parents, and teachers. Several studies have shown that friends influence adolescents' adjustments to a new school (Berndt & Keefe, 1995; Whitton & Perry, 2005) and that friendship, peer acceptance, and group membership have an established link with students' academic achievements (Wentzel & Caldwell, 1997). Parental involvement can also play an important part in the transition process (Dauber, Alexander, & Entwistle, 1996; Mizelle, 2005), although levels of involvement drop off as a student progresses through the school system. Teachers may help prepare students for this move by teaching coping skills such as self and time management, decision making, and conflict resolution (Schumacker & Sayler, 1995). Hawk and Hill's (2001) study found that "so many teachers are so focused on curriculum coverage that they do not take the time to incorporate these [for example, self and time management and study skills] into the programme" (p. 31). Successful transitions usually occur when the new schools involve students, parents, and teachers in the process (Smith, 2001) so that students experience a sense of community and belonging.

This study is concerned with two particular groups of students who do not always make this transition easily. The first group under consideration are Māori and Pasifika students. Whilst not suggesting that these students are a homogeneous group, they do have many social and cultural factors in common. Although the literature does not directly address transition, it (for example, Hawk, Cowley, Hill, & Sutherland, 2001; Hunter, 2007; Higgins, Makoare, Wilson, & Klaracich, 2005; Hill & Hawk, 2000; Macfarlane, 2004, 2007) draws attention to the need for teachers to ensure what Anthony and Walshaw (2007) term "social nurturing" (p. 60) exists in order for Māori and Pasifika students to be successful in classroom situations. To provide social nurturing, teachers need to be culturally responsive and able to build collaboratively on what Māori and Pasifika students bring to the classroom. Hunter's recent (2007) New Zealand study illustrated that when teachers attend to concepts of whānau [family], they develop classroom cultures that enact reciprocity – mutual respect that empowers all members of the community. In her study, the teachers carefully crafted care and support for student talk. Group norms provided the students with "the gift of confidence, the sharing of risks in the presentation of new ideas, constructive criticism, and the creation of a safety zone" (Mahn & John-Steiner, 2002, p. 52).

For transition to be successful for gifted and talented mathematics students, it is most important that they are grouped in their new school in a way that enables them to work with like-minded peers (Assouline & Lupkowski-Shoplik, 2003; Robinson, 2004). The mathematics programme should be designed to be challenging (Diezmann & Watters, 2004) and the curriculum differentiated[4] so that

[4] Qualitatively different (see Ministry of Education, 2000).

they are provided with a learning environment that not only maintains but strengthens their interests and achievements in mathematics. Mathematically gifted and talented students should also have continued opportunities to participate in competitions (Bicknell, 2008; Riley & Karnes, 2007).

The transition process for the two groups of students targeted in this study was examined using a framework developed by Anderson and colleagues (2000). They proposed three major concepts for understanding and improving school transition. These concepts are: preparedness, support, and transitional success or failure. Preparedness is multidimensional and includes academic preparedness, independence and industriousness, conformity to adult standards, and coping mechanisms. The second concept, support, which may be informational, tangible (resources), emotional, or social, facilitates successful transition. This support may come from peers, parents, or teachers. Transitional success or failure can be judged by factors such as results, appropriateness of a student's post-transition behaviour, social relationships with peers, and academic orientation. These indicators are what are commonly commented on in students' school reports (namely, achievement, conduct, and effort). This conceptual framework provided the basis for the data analysis and subsequent findings.

Research Design

The research reported in this study was designed to examine the transition process in mathematics for two groups of students moving from year 6 to year 7. The aim of the study was to understand the systems and structures in place in mathematics for students in the final year of primary school and the first year of intermediate school. These included assessment practices, achievement records, grouping practices, and the more specific provisions made at year 7 for gifted and talented students and for Māori and Pasifika students. The researchers wanted to know the ways in which practices between the two sectors, particularly those relating to the Numeracy Development Projects (NDP), coincided. They also wanted to examine the communication between the sectors, the depth of information provided about students, and the extent to which the intermediate schools drew on this information. How the students viewed their transition across school sectors, their perceptions about learning mathematics in the next sector, their preparedness for it, how successfully they had managed the transition process, what changes they had experienced, and how well they had coped with these changes were also considered.

The design of the research involved a collection of data that covered the end of one year and the early portion of the next year (see appendices H–I, pp. 189–194, for questionnaires and interview questions). Six weeks before the completion of year 6, all students and their parents from one class in each of six primary schools (within a decile range of 3–7) from two different geographical regions in New Zealand were asked to complete questionnaires. Sixty-seven of 141 questionnaires were returned (48%). Within each school setting, focus group interviews, in groups of about 10 students, were then completed with the 67 students who had returned questionnaires. At the same time, the corresponding year 6 classroom teachers completed a questionnaire. Numeracy lead teachers in each primary school participated in a semi-structured interview to clarify school policy and practices. Documentation (records of achievement, records used in transition, and teacher plans) were collected.

The students moved in the following year to three large intermediate schools and one year 7–10 school. Ten Māori and Pasifika students (one Māori student was also gifted and talented) were selected for the second phase of interviews. This group included all of the Māori and Pasifika students from one of the geographical areas who were available for interview. Half of these students were of both Māori and Pasifika ethnicity. Six other students who were identified in year 6 as gifted and talented in mathematics were also selected for the second phase of the study. Semi-structured focus-group interviews were held at each school six weeks after the students had begun their school year. A semi-

structured interview also took place with the four lead teachers in the intermediate and middle schools. The parents of the 16 students interviewed in this phase were all asked to complete a questionnaire. However, only three responses were received from parents of the gifted and talented students and one from a parent of a Pasifika student (this response was discounted because it was felt that one parent's view was not likely to be representative of the ten Māori and Pasifika students).

Results

The results presented are based on Anderson et al.'s (2000) conceptual framework and its three major concepts: preparedness, support, and transitional success or failure. These concepts have been reconsidered and the findings reported under the following subheadings: systemic, academic support, and transitional success and failure. The findings are also supported by the voices of the key stakeholders: the students, the teachers, and the parents.

Systemic

All students from the six schools were prepared for transition by making a visit to their new school, where they were shown around and given organisational information. Students were also provided with written material (a prospectus) about the school's structure and practices. One school in the study provided an additional visit for gifted and talented students (nominated by the year 6 teacher and/or parents). The purpose of this visit was for students to complete group problem-solving activities in mathematics. These results contributed to the school's identification of gifted and talented students.

A senior-management representative from each intermediate-level school visited the primary schools to talk with the year 6 teachers. The aim of this visit was for the year 6 teachers to have an opportunity to talk about specific students, such as gifted and talented students or those with specific learning or behavioural needs. These visits were deemed valuable because teachers shared information about students that they were reluctant to put in writing on the placement forms. In one case, a senior-management staff member attended Individual Education Plan (IEP) meetings for specific year 6 students with needs who were going to move on to their school.

Every year 6 classroom teacher in this study prepared written or electronic Teaching-Assessment-Planning (eTAP) records to pass on to the intermediate school. The format varied for every school, but the common elements were: current reading age or Supplementary Test of Achievement in Reading (STAR) results; Progressive Achievement Test (PAT) results for reading and mathematics; Assessment Tools for Teaching and Learning (asTTle); NDP data (Numeracy Project Assessment [NumPA], Individual Knowledge Assessment for Numeracy [IKAN], and Global Strategy Stage [GloSS]); and social and behavioural factors (recorded on a scale). None of the placement forms made provision for the dating of assessment data.

> I don't know if this was done at the beginning of year 6, the end of year 6, or at any other point of time. (Year 7 teacher)

Apart from NDP-related data and PAT results, limited provision was made for assessment data relating to other aspects of mathematics (such as geometry, measurement, and statistics). The forms allowed for a teacher to record additional notes. The section pertaining to work habits and social behaviours was recognised by one teacher as the most useful information received from the primary school.

Ten students in the original sample of 67 students were identified in year 6 as gifted and talented in mathematics, but only three of these were confirmed as such in year 7 and placed in special classes or programmes. One student had clearly been misidentified by the primary school, and six more were described by their new schools as hard workers but not gifted and talented. This was based on their

new assessments. This confirmed the practice of fresh start. All of the schools believed that gifted and talented students should be performing on at least stage 8 of the NDP Number Framework or achieve stanine 9 on the PAT.

All the intermediate schools in term 1 conducted their own numeracy reassessments. These assessments included PAT, asTTle, and the NDP's NumPA, GloSS, and IKAN. Two schools used exactly the same GloSS interview as had been used in year 6 by the primary school. The students verified this practice and expressed concern that they felt they had cheated because they had completed the same problems in year 6. Justification provided by the intermediate schools for reassessing students rather than using the primary school data was an expressed mistrust in the stated student numeracy stages. One intermediate school had developed a joint cluster project with their three primary schools that aimed to develop consistency in the transition data. However, despite this initiative, they continued to reassess all their year 7 students on entry:

> One thing we have noticed is we cannot believe the data, but we have our own tests too ... We start again to see what they can do and go from there. (Lead teacher, intermediate school)

This message was confirmed by all intermediate schools in this study. The lead teachers also reported that their retesting for numeracy placed many students on lower strategy levels than those reported in the primary school data. They believed (without full analysis of the assessment data) that the overall students' results for NDP stages were one or two stages lower than that recorded by the year 6 teacher. This generalised view further justified their reasons for this practice of "fresh start":

> We will just take the fresh start rather than looking at the old data, but I guess there would be a way perhaps of not having to do that ... if we learnt to trust that the year 6 teachers had done it properly. But we always feel that we need to start fresh, and so we do. (Lead teacher, intermediate school)

Reassessment of all students was also justified by the lead teachers on the grounds that the high number of schools contributing to the year 7 cohort (for example, up to seven for one intermediate) led to variation in assessment practices and cast doubt on the validity of their received data.

Grouping practices in year 6 were commonly based on students' numeracy strategy levels. One teacher grouped her students based on numeracy knowledge levels, and the other teacher used mixed-ability grouping rather than strategy grouping. At year 7, the approach to grouping across all the schools consistently drew on NDP strategy levels, with additional information provided from PAT and asTTle. Specific grouping practices at year 7 within a range of organisational strategies for mathematics were used to provide for the gifted and talented students in three of the four case-study schools. These included a full-time gifted and talented class, a withdrawal class for gifted and talented students, and a practice of spreading the gifted and talented mathematics students evenly across four year 7 classes. One school used no organisational strategy to group gifted and talented students for mathematics. Two of the four schools (one in each region) specifically considered grouping strategies in mathematics for Māori and Pasifika students. One school offered full-time bilingual classes, and another used a withdrawal group for its Pasifika students, placing them together for mathematics.

Academic

The year 6 teachers prepared the students academically for success in numeracy by focusing on some key mathematical skills and concepts. These included basic facts knowledge, problem-solving strategies, numeracy strategies, and, in some cases, the written algorithm with renaming. Other foci were place value knowledge, experience with textbooks, making mathematics relevant to the students' lives, and self-awareness of levels and experience in mathematics. The students described how key players (teachers and parents) in their transition had worked towards developing their thinking skills, risk-taking ability, confidence, and independence. One student explained:

> Our teachers challenge us and give us different work nearly every day, and we either get a maths book, a textbook, or just a sheet, and we work off those. Each time, there are different levels and challenging levels for your group. (Year 6 student)

Another student described the increased expectations of his parents:

> My parents have been more strict on me that way. I learn discipline and I don't muck around because they want me to get to a good college and they want me to push myself to the limit. (Year 6 student)

The students expected there to be some differences in the mathematics learning and teaching at their new school. Specifically in numeracy, there was an expectation that they would have to solve problems using new strategies. Other expected differences mentioned by the year 6 students included: mathematics would be harder and more complex, different, more work to do, less fun, more confusing, bigger numbers, and there would be less teacher time and greater use of textbooks. They also thought that the teacher would have higher expectations and use a different teaching style. The students described some of the desirable characteristics of their new teacher. These included: one who explains and encourages questions, one who spends several days on a strategy, and one who listens, gives regular homework, and caters for all ability levels. They anticipated that there would be some changes in grouping and seating arrangements. For the gifted and talented and the Māori and Pasifika case-study students, the major perceived difference was that the work would be a lot harder and more complex. The gifted and talented students saw this as being a challenge and also thought that there would be less time to complete the work. The Māori and Pasifika students believed that in year 7 they would have to solve problems using a greater range of strategies and that there would be higher teacher expectations.

The parents indicated that some of the important factors that would enable a smooth transition in mathematics from year 6 to year 7 would be if their children were mathematically confident (especially with basic facts), had no gaps in their mathematics knowledge, and had good work habits, especially in being more responsible for themselves. There was some concern from parents from one school that there were indications in the student profile that their children had not been taught some mathematical topics, such as fractions and percentages.

Several parents commented on the part that homework might play and that they anticipated more homework in the following year. The parents of the students identified in year 6 as gifted and talented in mathematics were particularly interested in the placements of their children; they were aware that their students were in the "top set" at primary school but showed an awareness that their children might be "little fish in a big pond" at their new schools. They wanted the mathematics to match their children's abilities, so that, for example, "he is not bored; when bored, he plays up for the teachers":

> I hope that there will be adequate and appropriate testing at the end of year 6 to assess where the child is at to make sure that the teaching level at year 7 suits the child's needs without overwhelming or boring them. (Parent of a gifted and talented student)

Support

Support for students was provided in tangible form by the systems described above, but support also came from others. These were peers, friends, siblings, and parents. For most of the students (gifted and talented, and Māori and Pasifika) moving to a new school with a friend assisted a smooth transition. Siblings and other whānau members also helped the process by sharing information about school uniform, organisational practices, and teachers:

> My brother has told me all about what the school does and everything that goes on and how the teachers are, so I am not as scared as I was before. (Year 6 Māori student)

> My sister tells me a lot about the teachers and all the different opportunities we can use, but I am still a bit nervous about the first day where you just go into the hall and they say what class you are in, but now that I know [about] the teachers it makes it a bit easier. (Year 6 student)

Many of the parents showed a real sense of commitment towards supporting their children. One parent commented:

> I know he has the ability to grasp new concepts easily, although he hasn't pushed himself in year 6, is quite capable of doing harder work. I feel he will either "sink or swim" depending on how he starts the year [year 7]. I am hopeful he will do well and am preparing him and myself to get into the new year's studies as I think he might need help initially to settle into a work routine. (Parent of a gifted and talented student)

Transitional Success or Failure

The gifted and talented students in special classes or programmes expected and appreciated the opportunity to work with like-minded peers in numeracy. They found the mathematics more challenging, at a more advanced level than in year 6, but still enjoyable. They were invariably working approximately one year or more in advance of their same-age peers. They found themselves with a larger group of students working at a similar level. As one student said:

> It's good to be with lots of people who are good at maths rather than just two working at the same level. Now it's about a third of the CWSA [Children with Special Abilities] class maybe. (Gifted and talented student)

These students were learning to cope as a small fish in a big pond. The two teachers from the gifted and talented class and withdrawal gifted class at the intermediate schools described key aspects of their programme that specifically catered for these students. These were summed up by one teacher:

> We are faster paced and we go further through the work, and so we can cover more ground, and we try to bring in that balance with the creative things as well ... You have to like maths, and if they see you like maths and you value maths, then they start to take that on board and they start to go that way too. (Year 7 teacher of gifted and talented)

The gifted and talented students in these two classes were also expected to participate in national and international competitions. This opportunity was not extended to other students in the school but reserved for those who had been identified for these special classes.

The six students who had previously been identified as gifted and talented students but were now classified as "hard workers" were placed in regular classes. They also talked positively about their current experiences in mathematics. They felt that the numeracy knowledge and strategies that they brought with them from primary school gave them a sound basis to continue with success in year 7. They were also learning new strategies and continued to feel confident about their achievements. These students had used textbooks as part of their year 6 numeracy programme and continued with greater use of them in year 7. Most of the year 6 teachers had deliberately made greater use of textbooks later in year 6 as part of the transition preparation.

Post-transition, three of the parents of gifted students responded to a questionnaire, and they all reported smooth transitions for their children. Two students had been placed in special classes (one was a full-time gifted class) at the beginning of year 7, and the third was promoted to a higher class (cross-class grouped for mathematics) after the school had completed its own reassessments. The positive comments from parents addressed their children's attitudes and the level of challenge of the mathematics. Two parents mentioned good communications from their children and teachers about the mathematics programme, whereas the third parent was waiting for parent interviews to gain insight into how well her child was achieving in year 7. The parents all recognised the part that homework played in helping to keep them informed about the mathematics programme, and one

parent commented that "we haven't had this for a long time". They did recognise that "intermediate is more 'hands off' for parents than primary".

Parental support in mathematics takes a variety of forms at primary school but usually lessens as children progress through the school system. This is usually due to age factors and parents' awareness that their understanding of mathematics is challenged as the level of mathematics increases. The parents of the gifted and talented mathematics students who responded in this study showed an interest in the transition process. They had no issues and no concerns about placement.

The Māori and Pasifika students, when talking about their transition experiences, focused on different aspects of numeracy learning and teaching in their new classes. The most common themes they identified were associated with basic facts, number operations (specifically addition and subtraction), numeracy strategies, group work, written work, pace, time, and level of challenge. The students recognised the importance of knowing their basic facts, but many still felt that they did not have mastery. They were surprised at the continued emphasis on whole-number work, specifically "pluses and minuses". There was an expectation that the work would be a lot harder and that they would be learning more about fractions. Several students were surprised that they had to remember and were expected to use previously learnt strategies (from year 6):

> Well, I do find it hard because I have forgotten the strategies I had to use last year and then there are the new ones this year. So it is all confusing, and I am still trying to remember them. (Year 7 Pasifika student)

The Māori and Pasifika students' collective voices made explicit links between basic facts and strategies as important knowledge to be learnt in numeracy lessons. However, rather than viewing strategies as a tool for solving number problems, they appeared to view strategies as a further collection of facts to be learnt and practised. They had expected that this practice, along with learning basic facts, would provide the main focus for their homework. No one appeared to have issues about year 7 homework.

These students spoke positively about the opportunities for working in groups. They liked being able to explain and talk about their strategies to others and felt that they learnt more in this situation compared with working from worksheets and textbooks. However, collectively they expressed some concerns about the quantity (too much) of written work and the fast pace of the lesson content, which led to limited time for students to understand and practise their old and new strategies. This also led to less time for question asking and answering and a fear of getting the wrong answer:

> I do not like it [year 7 mathematics] because you cannot ask questions because the teacher thinks you are not listening and other kids look at you like you are weird. (Year 7 Pasifika student)

There were contradictory student views about the appropriateness of the level of challenge for the students in numeracy. On one hand, the Māori and Pasifika students believed that the level of challenge was good for them because it was at a higher level than they had encountered at primary school. On the other hand, this level of challenge undermined their confidence:

> It's been very challenging for me, and I have not been working my best so far. I have found it really hard to concentrate in mathematics because I have had to step up more than I did in primary school. (Year 7 Pasifika student)

> I like year 6 maths better because when you make mistakes you could learn from them, but now it is too challenging. (Year 7 Māori student)

One school identified differences in their numeracy results between Māori and Pasifika students. The Māori students were out-performing the Pasifika students, and so the school, in discussion with parents, was implementing a remedial programme. This withdrawal remedial programme was

designed to build student confidence and competence in numeracy. This new initiative had not yet been evaluated. Interestingly, a case-study Pasifika student selected for this programme voiced her lack of understanding of its intent:

> What I have found challenging [post-transition] is the maths because we have to go to another room and that's a big step up for me. We do have maths in our class, but I think it is to get us used to maths in another class. (Year 7 Pasifika student)

Discussion and Conclusions

The transition from year 6 to year 7 when students change schools is an important event in students' educational lives. Its success involves considerable preparation on the part of schools and their management staff, classroom teachers, specialist teachers and support workers, parents, and the students themselves. While still in year 6, the students in this study considered their transition to their new school as a necessary rite of passage, which, with some reservations, they generally viewed positively. They recognised that the larger school held wider curricula choice:

> Well, looking at the curriculum activities there is a lot more there; like, you will get a better education. (Year 6 Māori gifted and talented student)

The students described how visits to the new school, information from their family and friends, and their current teacher's various preparatory strategies that emphasised specific concepts and skills positively prepared them for the shift. After the move to year 7, the key positive factors that the students collectively reported as being important for their successful transition were peer support, friendships, and group membership. Researchers (for example, Berndt & Keefe, 1995; Wentzel & Caldwell, 1997; Whitton & Perry, 2005) have identified such support as important for students' academic success. Consistent with the findings of Galton, Morrison, and Pell (2000), the anxiety the students described before the transition had generally dissipated after the event.

Before the move to year 7, both the gifted and talented and the Māori and Pasifika students voiced a hope for further mathematics challenge with teachers who "were keen on it [mathematics], and you actually do like [the teacher], because if you do not you are likely to have doubts about listening and [about] learning strategies" (Māori gifted and talented student). All the students anticipated a change in teacher expectations relating to the type of work, the volume and pace of the work, and the amount of time they would be given to complete the work. Māori and Pasifika students also expressed anxiety at the expected increase in challenge, in particular, the challenge that related to their current knowledge of basic facts and numeracy strategies and what mathematics knowledge they would be required to have in order to succeed in their new mathematics learning environment. Many of these concerns remained relevant in year 7 for these students as they grappled with the discontinuities they encountered with changes in the mathematics programme and teacher expectations. These findings are consistent with those previously described by Anderson et al. (2000). It was evident that some of these case-study Māori and Pasifika students were encountering difficulties in year 7 sustaining commitment to their mathematics learning.

Evidence is provided in this study of the serious approach all the schools took towards developing cohesive systems and structures to support the students in making the transition in numeracy. Careful attention was given to the transfer of relevant data both in oral and written form. The consistent use of a variety of NDP assessment tools (NumPA, GloSS, and IKAN) and the schools' teaching and learning practices grounded in the NDP had the potential to support a seamless and successful transition of students from one mathematics system to the next. However, the use of fresh start assessment (Galton & Hargreaves, 2002) impeded this process. The mistrust of the transition numeracy data caused many schools to retest, although the anecdotal evidence given by the year 7

lead teachers about students' lower levels could be accounted for by both the early timing of testing and a natural hiatus post-transition and post-holiday period. A few of the teachers recognised these contributing factors. The outcome of reassessment was a delay in grouping and in numeracy teaching and learning and a possible cause of too much mathematics challenge, as described by some students. Alternatively, it was the cause of an initial lack of challenge experienced by a gifted and talented Māori student who commented:

> "I knew that we would not learn new stuff right away. We have to learn all this stuff even if we did it at primary because that's how schools work. So you do the easy stuff first." (Māori gifted and talented student)

What this student was noting was what Hawk and Hill (2001) reported, that curriculum coverage appeared to be the key focus.

The potential limitation of some of the assessment tools used by both the primary and intermediate schools needs to be considered. The data from the primary schools invariably included PAT and asTTle scores and/or numeracy stages, for example, from NumPA. The intermediate school data also included newly completed PAT, GloSS, or IKAN results and used this information to form numeracy groups at the start of the year. Using PAT and asTTle tests in a summative form limits their potential. Likewise, IKAN is limited to numeracy knowledge stages, while only a few GloSS questions assess strategy stages, which can be quite different from knowledge stages. These practices may have led to the misidentification of a set of students identified as gifted and talented at year 6 but not at year 7. For specific groups of students, full diagnostic information would be beneficial. However, the use of NumPA to identify gifted and talented students also poses problems with its potential ceiling effect. This means that it cannot be used effectively to differentiate within the subset of gifted and talented students in mathematics. The need for differentiation was supported by the teacher of the full-time intermediate gifted class, who recognised noticeable levels of difference among her gifted and talented students.

Three of the four intermediate schools directly addressed ways to meet the needs of their gifted and talented students, and, as a result, this group of students reported differences in both mathematics content and instruction. Similar to the findings of Diezmann and Watters (2004), the results of this study showed enhanced levels of engagement for these students because they had increased opportunities to be mathematically challenged and work with like-minded peers. Two of the four schools made available bilingual or withdrawal groups for their Māori and Pasifika year 7 students. For one gifted and talented Māori student, this posed a challenge in that he had to decide between the special provisions offered in a gifted class and those in a bilingual class. As a group, the intermediate-school experiences of many of the Māori and Pasifika students appeared to be less than positive at this early stage in the school year. While they described the importance to their mathematics learning of talking with friends in small groups, the larger mathematics classroom situation posed many risks compared with their year 6 experiences. These findings illustrate the importance of teachers attending to classroom culture and explicitly affirming what the students bring to the classroom in what Macfarlane (2004) describes as "culturally responsive" (p. 27) ways so that learning competence is engendered.

Of interest in this study was the fact that no students referred to the use of technology (such as calculators and computers) or mathematics equipment. Perhaps, at year 7, the students expected a reduced emphasis on the use of manipulatives to support their mathematics learning. In reference specifically to the gifted and talented students, one of the lead teachers stated:

> All these children are preparing for high school maths, so we don't use a lot of equipment as you might have done at the lower levels. But we still have it here. There is the odd group of children who may need it. (Lead teacher, intermediate)

However, the use of concrete materials at all numeracy levels is a key component of the NDP. Many of the students believed that the strategies they learnt in year 6 would be replaced by a new set of strategies in year 7. This belief seemed to suggest that they considered numeracy strategies not as problem-solving tools but rather as knowledge to be learnt and mastered in a similar way to basic facts.

Although this study is limited by the small sample size, it does provide a picture of what transition might mean for students who are gifted and talented and/or Māori and Pasifika students. Further research is needed to follow longitudinally a larger sample of targeted mathematics learners across transitions to ascertain the effect of dips in achievement described by Anderson et al. (2000), and when, why, and what factors mitigate these dips.

References

Anderman, E. M., & Maeher, M. L. (1994). Motivation and schooling in the middle grades. *Review of Educational Research, 64*(2), 287–309.

Anderson, L. W., Jacobs, J. Schramm, S., & Splittgerber, F. (2000). School transitions: Beginning of the end or a new beginning? *International Journal of Educational Research, 33*(4), 325–39.

Anthony, G., & Walshaw, M. (2007). *Effective pedagogy in mathematics/pāngarau: Best evidence synthesis iteration [BES].* Wellington: Ministry of Education.

Assouline, S., & Lupkowski-Shoplik, A. (2003). *Developing mathematical talent: A guide for challenging and educating gifted students.* Waco, TX: Prufrock Press.

Berndt, T. J., & Keefe, K. (1995). Friends' influence on adolescents' adjustment to school. *Child Development, 66*(5), 1312–1329.

Bicknell, B. (2008). Gifted students and the role of mathematics competitions. *Australian Primary Mathematics Classroom, 13*(4), 16–20.

Catterall, J. S. (1998). Risk and resilience in student transitions to high school. *American Journal of Education, 106*(2), 302–333.

Cox, S., & Kennedy, S. (2008). *Students' achievement as they transition from primary to secondary schooling: Report No. 1 on the students' transition from primary to secondary schooling study.* Wellington: Research Division, Ministry of Education.

Dauber, S. L., Alexander, K. L., & Entwistle, D. R. (1996). Tracking and transitions through the middle grades: Channelling educational trajectories. *Sociology of Education, 69*(4), 290–307.

Demetriou, H., Goalen, P., & Rudduck, J. (2000). Academic performance, transfer, transition and friendship: Listening to the student voice. *International Journal of Educational Research, 33*(4), 425–441.

Diezmann, C. M., & Watters, J. J. (2004). *Challenge and connectedness in the mathematics classroom: Using lateral strategies with gifted elementary students.* Paper presented at the 10th International Congress on Mathematical Education, Copenhagen, Denmark.

Fabian, H. (2007). Informing transitions. In A.-W. Dunlop & H. Fabian (Eds), *Informing transitions in the early years: Research, policy and practice* (pp. 3–17). London: RoutledgeFalmer.

Galton, M., & Hargreaves, L. (2002). Transfer and transition. In L. Hargreaves & M. Galton (Eds), *Transfer from the primary classroom: 20 years on* (pp. 1–27). London: RoutledgeFalmer.

Galton, M., & Morrison, I. (2000). Concluding comments. Transfer and transition: The next steps. *International Journal of Educational Research, 33*(4), 443–449.

Galton, M., & Morrison, I., & Pell, T. (2000). Transfer and transition in English schools: Reviewing the evidence. *International Journal of Educational Research, 33*(4), 341–363.

Hawk, K., Cowley, E. T., Hill, J., & Sutherland, S. (2001). Relationships: The critical factor in teaching Māori and Pacifika students. *Proceedings of the New Zealand Association of Research in Education Conference,* Christchurch.

Hawk, K., & Hill, J. (2001). Troubled transition: How to ensure that educational transition points do not interrupt student learning. *Set: Research information for teachers, 3*, 29–32.

Higgins, J., Makoare, P., Wilson, R., &, Klaracich, Y. (2005). Effective teaching strategies for Māori students in an English-medium numeracy classroom. In *Findings from the New Zealand Numeracy Development Project 2004* (pp. 74–79). Wellington: Ministry of Education.

Hill, J., & Hawk, K. (2000). *Making a difference in the classroom: Effective teaching practice in low decile multicultural schools.* Wellington: Ministry of Education.

Hunter, R. (2007). Scaffolding small group interactions. In J. Watson, & K. Beswick (Eds), *Mathematics: Essential research, essential practice* (Proceedings of the 30th annual conference of the Mathematics Education Research Group of Australasia, Vol. 2, pp. 430–439). Adelaide: MERGA.

Macfarlane, A. H. (2004). *Kia hiwa ra! Listen to culture: Māori students' plea to educators.* Wellington: New Zealand Council for Educational Research.

Macfarlane, A. H. (2007). *Discipline, democracy, and diversity.* Wellington: New Zealand Council for Educational Research.

Mahn, H., & John-Steiner, V. (2002). The gift of confidence: A Vygotskian view of emotions. In G. Wells, & G. Claxton (Eds), *Learning for life in the 21st century* (pp. 46–58). Oxford: Blackwell.

Ministry of Education. (2000). *Gifted and Talented Students: Meeting their needs in New Zealand schools.* Wellington: Learning Media.

Mizelle, N. B. (2005). Moving out of middle school. *Educational Leadership, 62*(7), 56–60.

Noyes, A. (2006). School transfer and the diffraction of learning trajectories. *Research Papers in Education, 21*(1), 43–62.

Riley, T. L., & Karnes, F. (2007). Competitions for gifted and talented students: Issues of excellence and equity. In J. Van Tassel-Baska (Ed.), *Serving gifted learners beyond the traditional classroom* (pp. 145–168). Waco, TX: Prufrock Press.

Robinson, N. M. (2004). Effects of academic acceleration on the social-emotional status of gifted students. In N. Colangelo, S. G. Assouline & M. U. M. Gross (Eds), *A nation deceived: How schools hold back America's brightest students* (Vol. II, pp. 59–68). Iowa City, IA: The Connie Belin & Jaqueline N. Bank International Center for Gifted Education and Talent Development.

Schumacker, R. E., & Sayler, M. (1995). Identifying at-risk gifted students in an early college entrance program. *Roeper Review, 18*(2), 126–129.

Smith, J. B. (2001). Effects of eighth-grade transition programs on high school retention and experiences. *The Journal of Educational Research, 90*(3), 144–152.

Wentzel, K. R., & Caldwell, K. (1997). Friendships, peer acceptance, and group membership: Relations to academic achievement in middle school. *Child Development, 68*(6), 1198–1209.

Whitton, D. R., & Perry, B. (2005). Transition to high school for gifted and mainstream students. *The Australasian Journal of Gifted Education, 14*(1), 30–35.