



MINISTRY OF EDUCATION NEW ZEALAND

*Te Tāhuhu o te Mātauranga Aotearoa*



## **Programmes for Students 2012: Report on three evaluative studies**

Research Division  
Ministry of Education

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# Executive summary

## Introduction

This report presents the findings of three evaluative studies looking at the 2012 *Literacy and Mathematics: Programmes for Students*. Programmes for Students (PFS) is a Ministry of Education initiative providing primary schools with teacher release time to work with students who are assessed as below or well-below the National Standards in mathematics, reading or writing. PFS uses the expertise within the school to accelerate the progress of these students.

There are three programmes; one programme for literacy: Accelerating Literacy Learning (ALL) and two programmes for mathematics: Accelerating Learning in Mathematics (ALiM) and Mathematics Support Teacher (MST). The ALL is aimed at students identified as below and well-below the National Standards in reading or writing. The ALiM programme is aimed at students below the National Standards in mathematics and the MST programme is aimed at students identified as well-below the National Standards in mathematics.

The programmes are designed to be delivered by an effective mathematics or literacy teacher within a school. The teacher delivers the programme to small groups of students in addition to regular classroom teaching. The teachers receive support from a mentor throughout the programme. ALiM and ALL are 10-15 week programmes. The MST programme runs across the whole-school year with students receiving support for around two-terms (20 weeks). A requirement of the MST programme is that teachers complete a post-graduate paper.

## Participating schools

Schools were selected to participate in the programmes by regional Ministry of Education offices with input from mathematics facilitators, literacy advisors and the PFS National Leaders. School selection criteria included effective school leadership, having students identified as below or well-below national standards and effective classroom practice in literacy (ALL) and/or mathematics (ALiM/MST).

In 2012, 307 schools took part in ALL programmes, 337 schools took part in ALiM programmes and 76 schools took part in MST programmes.

## Evaluation methodology

Three evaluative studies were undertaken to see how the programmes were developing and help inform the PFS programme leaders to make adjustments to programme operation and delivery. The studies were designed to look at student progress in ALL and ALiM; the first six months of the MST programme; and factors contributing to successful and sustainable programmes.

The research questions that related to each study were:

1. What progress did students who participated in ALiM and ALL programmes in 2012 make? Was this progress accelerated?
2. How did the MST programme operate in schools during the first six months of implementation? What progress did students involved in the MST programme make?
3. What factors contributed to the success and sustainability of the programmes in schools?

The evaluation collected data from a number of sources: online surveys, analysis of student achievement data, interviews and school reports. Student achievement data were sought from all schools involved in the programmes in 2012. The student achievement data collected pre- and post- programmes were:

Programme	Assessment tool <sup>1</sup>	Year Level
ALiM and MST	GloSS	Years 1-8
ALiM and MST	PAT: Mathematics	Years 4-8
ALL junior literacy	Observation Survey	Years 1-3
ALL reading	STAR	Years 3-8
ALL writing	e-asTTle writing <sup>2</sup>	Years 1-8

Visits were made to 12 MST schools in August and September 2012. Online surveys were emailed to all MSTs and MST school principals. Visits were made to an additional 15 ALiM and ALL schools to understand success and sustainability factors of the programmes.

## Findings from the evaluative studies

### Student progress in ALiM and ALL in 2012

The pre- and post- programme student achievement analyses shows the 2012 programmes were successful in accelerating the progress of students in mathematics, writing and reading. In this study, progress was looked at in relation to norm expectations and whether the progress made by students was to expected levels for their year group by the end of the programme.

Overall, the majority of students participating in the ALiM and ALL programmes in 2012 made more than expected progress over the timeframe of the programmes (10-15 weeks). Students in ALiM, on average, made more than two terms progress on PAT assessments and students in some Years 4, 5 and 7 ended the programme above the expected levels for their year. Students, on average, made more than one year's progress as measured by GloSS (Global Strategy Stage). These patterns were observed across gender and ethnicity.

E-asTTle writing student achievement data showed progress in writing was in excess of one year's progress. For some year groups this meant the students ended the programmes close to the expected levels. In junior literacy programmes most students made progress on all aspects of the Observation Survey and on average reached the expected stanine for their age.

### MST programme

The findings from this initial exploratory research show the MST programme was leading to positive changes for students, teachers and schools. The MST programme had only been operating in schools for six months when the fieldwork was undertaken. The post-graduate paper had been well received and was assisting teachers to change their practice. The paper was seen as valuable, interesting and relevant but had led to additional work for the MST teacher.

The MST programme student achievement analyses shows the programmes implemented in schools were effective in accelerating progress for most students. The GloSS assessment data showed 70 percent of students increased one or more stages over the intervention. A year's progress is around one stage. For PAT the mean scale score progress made by students was above that expected for two terms. The length of programme students received was not provided in the

<sup>1</sup> A brief summary of each tool is contained in the Appendix.

<sup>2</sup> Re-calibration of the e-asTTle writing tool occurred in April 2013. As both pre and post programme data was collected in 2012 the results are not affected by the re-calibration.



data. However, students were expected to receive programme support for around 20 weeks or two terms, if this was the case it suggests accelerated progress was achieved by many students.

### Factors contributing to successful programmes

A 2011 evaluation<sup>3</sup> by the Wilf Malcolm Institute of Educational Research (WMIER) identified key elements of programme organisation that contributed to programme success. These were small groups, targeted teaching, sessions of 30 or more minutes at least four times a week and a school focus on using student achievement data.

The Ministry refined the PfS model for 2012 based on the evaluation findings and schools reports from 2011. Messages at the planning days and the accompanying documentation encouraged schools to accelerate progress for their target students but also encouraged schools to plan for how they would maintain or sustain any positive changes from the programme.

The 2012 evaluative studies sought to identify factors that contributed to success and sustainability of the programmes by purposefully focusing on more successful schools based on their student achievement data. The 2012 evaluation visited 27 schools that had run successful programmes in terms of improvements in student achievement. Through these visits it was evident there were common important elements of the programmes run by these schools. These elements were:

- leadership and strategic planning
- programme organisation
- inquiry teaching
- capability building through professional learning communities, support – mentors/advisors/coach
- strong relationships between students, teacher, parents/whānau and communities, and
- a focus on student's need/outcomes.

#### *Leadership and planning*

Principal and leadership support are key to on-going success and sustainability. School leaders were responsible for managing the organisation elements (release time, relief teacher) and set the tone and expectations for the programme within the school. With effective support the programmes were able to reach a wider number of students and influence additional teaching staff, not just those directly involved in the programme. Without this support programmes were likely to only impact on student achievement for those in the programme.

Leadership enabled a whole-school focus on literacy or mathematics by giving priority and visibility to the ALL, ALiM or MST programme which, in some schools, included a restructure of resources and timetables. Through leadership support, teachers also felt supported to make pedagogical changes.

#### *Programme organisation*

Previous participation in PfS was helpful to schools as it made the programme organisation easier to manage, set expectations of success and enabled schools to focus on capability building and sustainability.

Use of multiple teachers, mentors and inquiry teams was common in the successful schools. These techniques helped to transfer the knowledge gained by the programme teachers to other teachers to improve teaching practice and the wider culture of learning.

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<sup>3</sup> Cowie, B. et al (2012). Evaluation of Literacy and Mathematics Additional Learning Programmes for Students 2011. Wellington: Ministry of Education. <http://www.educationcounts.govt.nz/publications/literacy/114816>

### *Inquiry teaching*

Involving multiple teachers in PfS and providing time for teachers to share ideas and suggestions about students through inquiry teaching was powerful in building trust, respect and inter-classroom connections. Successful schools offered teachers opportunities to share and collaborate in a safe environment using inquiry teaching. Involving more than one teacher requires good organisation at the beginning of the programme but the outcomes for schools that did this suggest this effort is rewarded. The inclusion of multiple teachers also allows for capability building, succession planning and sustainability.

Working in inquiry teams meant teachers felt supported to take queries and difficulties to their team meetings and share ideas. Some schools also organised collaborative planning sessions and moderation of students' work. Teachers in these schools commented on the value of the team approach as this shared the responsibility and helped all team members to adapt their teaching through learning conversations and reflections.

### *Capability building*

Teachers in the successful schools found the programmes provided them with learning and development opportunities. This is particularly true for the MST programme due to the post-graduate paper but many ALiM and ALL teachers saw the programmes as a learning and development experience.

Schools benefited from building knowledge gained from running the programmes within their own school and using this to further develop and refine their programmes into the future.

### *Relationships*

Knowing their students and having strong student-teacher relationships were important to accelerate student progress. Building students' trust and confidence in the subject were also important steps for the programme. Working in small groups in safe environments with student focused tasks helped to develop those relationships.

Relationships between programme and classroom teachers were enhanced through use of inquiry teams and led to higher expectations for students across the schools. Schools noted strong relationships with whānau and families were also important to support student learning. Schools used different approaches to encourage whānau and families to come to school, for example some schools had success with breakfasts, open evenings and invitations to visit sessions. This was an area where most schools visited felt they needed to continue to focus.

### *Sustainability*

Many of the schools visited had seen positive changes through their participation in PfS and acknowledged the value of continuing with a form of the programme after the funding ended. In order to be able to maintain the PfS programme some schools had restructured roles within schools.

The factors that enabled schools to run successful programmes were the same factors that led to sustainable programmes. The degree to which the programmes were being sustained after the Ministry funding finished and reaching more students than the initial group was dependent on the schools ability to disperse the programme throughout the school. If factors such as leadership, inquiry teaching, student focus, strong relationships and capability building were present the programmes were likely to be successful as well as sustainable over time.

### **Conclusion**

Looking across the three studies the evidence suggests that the 2012 ALiM, ALL and MST programmes were effective in accelerating the progress of students who were not achieving the National Standards. The majority of ALiM and ALL writing students made progress that exceeded expected progress during the programmes but not all reached the level expected for their year by the end of the programmes. The findings were mixed for those students who participated in

ALL junior literacy and MST. This is partly due to data measurement issues and partly due to the amount of progress needed to reach expected levels as many students began the programmes well-below those levels.

PfS are not generic interventions, rather they offer an opportunity for a school to use release time for their teachers in the most suitable way to raise student achievement. Principals and teachers said the programmes provided an opportunity to make on-going improvements for their under-performing students and also for the teaching and learning at their school.

# Introduction

This report presents the findings of three evaluative studies of the 2012 *Literacy and Mathematics Programmes for Students*. The three studies looked at: student progress of Accelerating Learning in Mathematics (ALiM) and Accelerating Literacy Learning (ALL), the Mathematics Support Teacher (MST) programme and factors contributing to the success and sustainability of the programmes.

## Background

Programmes for Students (PFS) were part of a range of initiatives begun in 2010 for students not achieving the National Standards. PFS are targeted, tailored initiatives for primary school students achieving below and well-below the National Standards for reading, writing and mathematics. The programmes are designed to be delivered by an effective mathematics or literacy teacher within a school. Primary schools are provided with teacher release time to work with small groups of students in addition to classroom teaching.

Schools were invited to take part by Ministry of Education regional offices, with input from mathematics facilitators, literacy advisors and professional learning development (PLD) providers. The interventions under the initiative are Accelerating Learning in Literacy (ALL), Accelerating Learning in Mathematics (ALiM) and the Mathematics Support Teacher programme (MST). The interventions use expertise within the school to undertake short-term interventions to accelerate the progress of identified students. Schools choose the area of focus for their programme based on a needs-assessment of their students.

The programmes aim to accelerate progress for different groups of students. The ALL programme aims to accelerate progress for students who were below and well-below the expected National Standard in reading or writing for their year level. The ALiM programme aims to accelerate progress for students who were below the expected National Standard in Mathematics for their year level. ALiM and ALL programmes usually run for around one term (10-15 weeks). The MST programme aims to accelerate progress for students well-below the expected National Standard in Mathematics for their year level. The MST programme runs across the year, with the MST expected to work with groups of students for up to 20 weeks at a time. The MST also undertakes two years of study into teaching practices to support acceleration of student achievement in mathematics and transfer learning across the school.

## Development of the programmes

The programmes began in 2010 with ALiM pilot programmes. The ALiM programmes were developed following the principles of Effective Pedagogy in Mathematics<sup>4</sup> and Quality Teaching for Diverse Students<sup>5</sup>. Thirty-nine schools were selected to participate in the pilot programmes by Ministry of Education regional offices. Each school selected an effective teacher to provide support to a group of students in addition to regular classroom teaching.

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<sup>4</sup> Anthony, G., & Walshaw, M. (2009). Effective pedagogy in mathematics - Educational Practice Series 19 International Academy of Education & International Bureau of Education, Paris: UNESCO.  
[http://www.ibe.unesco.org/fileadmin/user\\_upload/Publications/Educational\\_Practices/EdPractices\\_19.pdf](http://www.ibe.unesco.org/fileadmin/user_upload/Publications/Educational_Practices/EdPractices_19.pdf)

<sup>5</sup> Alton-Lee, A. (2003). Quality Teaching for Diverse Students in Schooling: Best Evidence Synthesis. Wellington: Ministry of Education.  
<http://www.educationcounts.govt.nz/publications/series/2515/5959>

In 2011 two programmes were run in mathematics. The ALiM programmes were run again and a Specialist Mathematics Teachers (SMT) programme was introduced aimed at students well-below the National Standard. Literacy programmes were also introduced aimed at students below the expected National Standard and covered reading, writing and English language learning.

### Programmes for Students in 2012

In 2012, 307 schools participated in ALL programmes, 337 participated in ALiM programmes and 76 schools participated in MST programmes. ALiM programmes focused on students who were below the National Standard in mathematics. ALL programmes focused on students who were below and well-below the National Standard in reading or writing. A Mathematics Support Teacher (MST) programme was trialled in response to the needs of students identified as well-below the National Standard in mathematics requiring greater support. MST was adapted from the 2011 SMT role and designed to be run over a full year.

### Previous evaluation findings of PfS

In 2010 NZCER conducted an exploratory evaluation<sup>6</sup> of the thirty-nine schools who took part in the pilot ALiM programme. The evaluation findings showed increases in mathematics achievement for the majority of students. Students gained at least one stage on the Number Framework as measured by the Global Strategy Stage diagnostic interview. PAT: Mathematics scores increased, typically increasing between half a year and over a year's growth over the 6-10 week programme. Student attitudes towards mathematics also became more positive after taking part in the programmes.

The Wilf Malcolm Institute for Educational Research (WMIER) conducted an evaluation<sup>7</sup> of the 2011 literacy and numeracy programmes. The evaluation focused on understanding the effectiveness of the programmes using evidence from case studies, surveys and student achievement data. Increases in achievement were noted for the majority of students.

In ALiM the majority of students gained at least one framework stage. In both the ALiM and SMT programmes students' PAT scale scores significantly increased from pre to post programme. Positive changes in attitudes were noted between the pre and post programme surveys as confidence, motivation and engagement increased. In literacy, the overall results appeared positive, however, the quality and quantity of achievement data collected was limited so results must be interpreted with caution. Students in the writing programmes improved on average by at least one level on the asTTle writing assessment. In the reading programmes, mean scores for the Observation Survey increased and the majority of students improved by two or more levels on the Ready to Read instructional series.

The WMIER evaluation identified key elements in programme organisation that contributed to the improvements in student attitudes and achievement. These included small groups, responsive, targeted teaching, regular (at least 4 times per week) sessions longer than 30 minutes, reflection time and a focus on, and use of data. Principal leadership and support across the school were also identified as important to the success of the programmes.

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<sup>6</sup> Neill, A., Fisher, J., & Dingle, R. (2010). Exploring Mathematics Interventions: Exploratory evaluation of the Accelerating Learning in Mathematics pilot study. Wellington: New Zealand Council for Educational Research <http://www.nzmaths.co.nz/sites/default/files/Numeracy/References/ALiMreport.pdf>

<sup>7</sup> Cowie, B. et al (2012). Evaluation of Literacy and Mathematics Additional Learning Programmes for Students 2011. Wellington: Ministry of Education. <http://www.educationcounts.govt.nz/publications/literacy/114816>

## 2012 Programmes for Students Evaluative work

The evaluative work for PfS in 2012 was designed to build on the knowledge and understanding gained from previous evaluations. The 2010 and 2011 evaluations provided evidence of improvement in student achievement over the programmes. The evaluations also provided some information about factors for successful programme organisation and student attitude changes following the programmes.

In 2012, the evaluation focus for the ALL programmes was to strengthen the quality and quantity of the data collected from participating students. For ALiM, as well as collecting programme achievement data the study attempted to look at the sustainability of student achievement by collecting a third data assessment at the end of the year.

The MST programme began in 2012. An evaluative study was designed to provide the Ministry with an understanding of how the programme was initially operating in schools and collect student achievement data pre and post programme.

The 2012 PfS evaluative work was therefore to investigate three groups of evaluative questions:

- Q1 What progress did students who participated in the ALiM and ALL programmes in 2012 make? Was this progress accelerated? In ALiM, was the progress maintained the following term?
- Q2 How did the new Mathematics Support Teacher (MST) programme operate in schools during the first six months of implementation? What progress did students involved in the MST programme make?
- Q3 What factors have contributed to the success and sustainability of the programmes in schools?

These three questions led to the design and implementation of three evaluative studies in 2012:

- Student Progress and Achievement for ALiM and ALL
- The Mathematics Support Teacher (MST) programme
- Success and sustainability of the programmes.

This report presents the findings from the three studies. Initial findings were used by the Ministry to inform the development of 2013 programmes.

# Methodology

The 2012 PFS evaluative work comprised of three studies designed to answer the three evaluation questions. For each study data were gathered from a number of sources.

## Study 1 - Student progress and achievement for ALiM and ALL

- What progress did students who participated in the ALiM and ALL programmes in 2012 make?
- Was this progress accelerated?
- In ALiM, was the progress maintained the following term?

To measure the progress made by students during the ALiM and ALL programmes, participating schools were asked to record pre and post programme achievement data using specified assessment tools. To look at progress after completion of the ALiM programme when students return to classroom a third data collection was also requested at the end of the year.

### Acceleration

The aim of the ALL and ALiM programmes was to accelerate student progress. Acceleration is defined as the student's progress showing:

- a noticeably faster, upward movement than might otherwise have been expected by the trend of their own past learning;
- a rate faster than peers progressing at expected rates in order to achieve equitable outcomes; and
- the learner's achievement is at a level consistent with, or beyond, a set of benchmarks or standards (e.g. New Zealand Curriculum National Standards).

Measuring student progress and achievement, particularly for short term interventions and programmes is complex and measuring accelerated progress even more so. The evidence collected for this study aimed to provide information to address the second and third part of the above definition of acceleration. Achievement data were not collected on the student's rate of progress prior to the programme.

Pre and post programme student achievement data provides information about progress the student made during the programmes. Using assessment tools that have 'normed' data allows for comparison between the amount of progress made during the programme and that usually expected over a similar timeframe.

Collecting a third time point following completion of the programme provides an indication of the achievement when students return to receiving classroom teaching only. Data from ALiM students using the GloSS assessment was requested at the end of the year for this purpose.

## Student achievement data

Table 1 shows the achievement data provided by schools pre and post the ALiM and ALL programmes. Brief descriptions of each assessment are provided below.

**Table 1: Student achievement data used in analyses**

Programme	Assessment tool <sup>8</sup>	Year Level
ALiM	GloSS	Years 1-8
ALiM	PAT: Mathematics	Years 4-8
ALL junior literacy	Observation Survey	Years 1-3
ALL reading	STAR	Years 3-8
ALL writing	e-asTTle writing <sup>9</sup>	Years 1-8

### *ALiM*

For students participating in the ALiM programmes, data from the Global Strategy Stage (GloSS) diagnostic interview were requested for all students in Years 1 to 8 and data from the Progressive Assessment Test (PAT): Mathematics for students in Years 4 to 8. Schools were also asked to provide end of the year GloSS data for their ALiM students.

### *ALL*

For students participating in junior literacy programmes achievement data were gathered using the Observation Survey. For writing programmes e-asTTle was used and reading programmes used the STAR assessment. Schools returned their literacy data to the Ministry of Education using a standardised reporting template.

### *Student achievement data cautions and limitations*

A number of errors and inconsistencies in the student achievement data were identified during the analysis. These included:

- Students with multiple assessment results
- Students with assessment data at different levels to their year
- Schools had used inconsistent norm referencing
- STAR data provided did not specify the version of the test used.

Data considered to be inconsistent or unreliable for the reasons above were not included in the analysis. None of the STAR data collected for the Years 3-8 ALL reading programmes could be analysed as the version number of the test was not provided.

Analysis of the assessment data were undertaken on behalf of the Ministry by NZCER (PAT) and Maths Technology (GloSS, Observation Survey and e-asTTle writing).

<sup>8</sup> A brief summary of each tool is contained in the Appendix.

<sup>9</sup> Re-calibration of the e-asTTle writing tool occurred in April 2013. As both pre and post programme data was collected in 2012 the results are not affected by the re-calibration.



## Study 2 - The Mathematics Support Teacher (MST) programme

- How did the Mathematics Support Teacher (MST) programme operate in schools during the first six months of implementation?
- What progress did students involved in the MST programme make?

The MST programme was run in 76 schools in 2012. To understand how the programme was being implemented data were collected through school visits, online surveys and facilitator interviews. To assess the progress students made student achievement data were collected pre- and post- programme. The visits focused on the operational aspects of the programme to provide guidance to the Ministry for the development of the programme for 2013.

Schools were purposively selected for the visits. The mathematics facilitators and PfS National Leaders recommended schools where the MST programme was working well. Other factors such as school decile and location were also taken into account. Schools were chosen to provide diverse perspectives and experiences of the MST programme.

Twelve schools were visited during August and September 2012, around six months after the start of the programme. Schools were located in Auckland, Hawke's Bay, Masterton, Wellington, Christchurch and Dunedin.

Interviews were undertaken with the principal and/or another key member(s) of the leadership team and the MST(s). Schools were invited to reflect on their participation in the programme, what had gone well and any difficulties they had experienced. Schools were also asked to reflect on any changes observed in the school during the programme.

An online survey was sent to each MST and their school principal to find out details of programme organisation and operation. Sixty-one responses were received from 73 MSTs (84% response rate) and 51 responses were received from 72 principals (71% response rate)<sup>10</sup>. A mixture of focus groups and interviews were also conducted with six mathematics facilitators to discuss the design and implementation of the programme from their perspective

To determine the progress made by students participating in the MST programmes schools were asked to record pre and post programme assessment data (GloSS diagnostic interview and PAT: Mathematics). The data were analysed by NZCER and Maths Technology.

<sup>10</sup> Email addresses were available for 73 MSTs and 72 school principals from 76 MST schools.

### Study 3 - Success and sustainability of the programmes

- What factors have contributed to the success and sustainability of the programmes in schools?

To understand the conditions needed for successful and sustainable programmes a methodology based on the Success Case Method<sup>11</sup> was adopted. This approach assumes that learning from those who experience the greatest success can help understand how others can make improvements in order to be successful.

The ‘success cases’ in this instance were schools that delivered successful programmes and were sustaining some of the practices following completion of their programme. A short-list of schools was identified as likely ‘success cases’ by PfS programme leads and the facilitators. Other criteria taken into account when selecting schools to visit were size, location, type of PFS programme, ethnic composition of the school and decile.

Visits were made to 27<sup>12</sup> schools who had participated in PfS in either 2011 or 2012. This included the 12 schools visited as part of the MST study. The MST schools were a valuable source of information in terms of sustainability as in most cases the schools had participated in ALiM prior to participating in MST.

Interviews were conducted with the key programme participants; principal, programme teacher and other key individuals, to understand what had contributed to the success and sustainability of PfS at the school. School reports and student achievement information were also referenced and the evaluators attended MST training and impact days.

Visits were made to schools after they had completed their programmes. Some schools had taken part in both mathematics and literacy programmes.

**Table 2: Sample of schools in the 2012 PfS study**

School location	MST <sup>13</sup>	ALiM	ALL
North Island	10	2	9
South Island	2	2	4
Total	12	4	12

<sup>11</sup> Brinkerhoff, R. O. (2003). The success case method: Find out quickly what’s working and what’s not. San Francisco, CA: Berret-Koehler.

<sup>12</sup> One school was visited for both ALL and ALiM programmes.

<sup>13</sup> Some of these schools participated in ALiM prior to MST

# Student progress and achievement for ALiM and ALL

## Study 1 - Student progress and achievement for ALiM and ALL

- What progress did students who participated in the ALiM and ALL programmes in 2012 make?
- Was this progress accelerated?

## Introduction

The following section presents the student achievement analyses for the ALiM and ALL programmes. Student achievement was assessed by measuring the change in achievement using a variety of assessment tools. All schools participating in the ALiM and ALL programmes in 2012 were asked to record student achievement data pre and post programme.

For details about the assessment tools used please see the previous methodology section. The results for each assessment are reported separately. Please note the MST student achievement analysis is presented in the next section.

## Data used in the analysis

The table below shows the number of schools and students in the student achievement analyses from ALiM and ALL in this section. In 2012, 337 schools participated in ALiM programmes. Seventy percent of ALiM schools provided GloSS or PAT data that could be used in the analysis.

In 2012 a total of 307 schools participated in ALL programmes. Of these, 135 schools provided e-asTTle writing data and 80 schools provided junior literacy data. It is not known how many schools out of the total conducted writing or reading programmes so we do not know the proportion that returned data.

**Table 3: Schools participating in ALiM and ALL 2012**

2012 Programmes for Students	ALiM		ALL	
Number of participating schools <sup>14</sup>	337		307	
Assessment used in the analyses	PAT: Maths	GloSS	e asTTle writing	Observation Survey
Number of schools providing matched (pre and post) data for students <sup>15</sup>	236	234	135	80
Proportion of participating schools that provided data for analysis	70%	69%	-	-
Number of students included in the analyses	2,353	2,656	1,145	532

<sup>14</sup> Source: Ministry of Education Programmes for Schools participation statistics 2013

<sup>15</sup> Source: New Zealand Council for Educational Research & NZMaths reports

## Overall results of students in ALiM and ALL 2012

Overall, the student achievement data provided suggests the 2012 ALiM and ALL programmes were successful in accelerating progress of students in mathematics, writing and junior literacy over the period of the programmes (around one term). Table 4 provides a summary of the student achievement analyses.

In ALiM, students made more than two terms progress as measured by PAT in general reached expected achievement levels for their year.

In writing, students across all year groups made progress in excess of expected progress for one year. The average gain on the e-asTTle assessment was 120 points. The score gains differed by year level and ranged from 106-142. This shows improvements of around one curriculum level (116 points) over the programme.

In the junior literacy programmes nearly all students (94%) gained at least one text level. For those at the lower end of the colour wheel this would be expected progress but for those further on (Orange and above) this would be more than expected progress in one term. Progress was made in all areas measured by the Observation Survey.

**Table 4: Summary of student achievement assessments**

PfS	Assessment	More than 2 terms progress?	Reached expected year level?	Results for various groups of students
ALiM	PAT: Maths	Yes	Yes (for some)	Across both genders & all year levels students made more than two terms progress. Students from all ethnicities made more than two terms progress. Students in Years 4, 5 and 7 ended the programme above the achievement norms for their year.
	GloSS	Yes	Not known	Using the generated scale-score both genders and all ethnicities made around 1 year of progress during the programme. Students in Years 5-8 made over a year's progress, students in Years 2-4 made nearly a year's progress.
ALL	e-asTTle Writing	Yes	No – (but almost for most years)	Student scores on the e-asTTle assessment improved by an average of 120 points, making more than 2 terms progress. Students on average were close to but did not reach year level expectations.
	Observation Survey	Yes – for some	Yes	Nearly all students (94%) gained at least one text level. Most students reached the average stanine for their age.

## Accelerated Learning in Mathematics (ALiM)

### Description

The ALiM programme uses expertise within a school to carry out a short-term intervention to accelerate the progress of students achieving below the New Standards in mathematics. The ALiM programme is in addition to classroom teaching. Teachers work three to five times a week with a group of students for 10 to 15 weeks.

### ALiM outcome analysis

To assess student progress and achievement in ALiM teachers were asked to conduct pre and post programme assessments using the Progressive Assessment Test (PAT) and the Global Strategy Score (GloSS) assessment. In 2012, 337 schools participated in ALiM.

### Overall results of ALiM in 2012

- Students from all year groups measured by PAT made progress over what is expected in two terms compared to PAT norming data.
- Results differed slightly by year level. Years 5-7 made more than double the expected progress for two terms.
- GloSS results showed students made slightly more than one year's progress during the 10-15 week intervention.
- Results differed slightly by year level. Students in the older year (Years 4-8) made more than one year's progress. Students in the younger years (Years 2 and 3) made just under one year's progress.

### PAT Data

ALiM (PAT) pre- and post-programme PAT data were supplied by 236 schools for 2,353 individual students. Three quarters (72%) of students were in Years 4-6 and there were slightly more female students (55%) than male students (45%). Almost half (47%) of the students were identified as NZ European and one third (32%) of the students were identified as Māori<sup>16</sup>.

**Table 5: Data used in PAT: Mathematics analysis of ALiM**

		N	%
Schools		236	-
Students		2,353	-
Gender	Male	1,057	45%
	Female	1,296	55%
Ethnicity	Māori	754	32%
	Pasifika	327	14%
	NZ European	1,106	47%
	Other	191	8%
	Unknown	76	3%
Year level	3	280	12%
	4	682	29%
	5	567	24%
	6	446	19%
	7	248	11%
	8	129	5%
	9	1	<1%

<sup>16</sup> Most students were associated with only one ethnicity but they could have up to three recorded. For this reason, totals across ethnic groups exceed sample totals and an individual student's result may be considered up to three times in analysis of data by ethnicity.

### *PAT Student progress*

Across all year groups student progress in ALiM as measured by PAT was in excess of expected progress for two terms. The programmes were one term in duration.

Figure 1 below shows the mean scale progress score alongside the expected PAT scale score for two terms. Expected progress is based on data for the wider population.<sup>17</sup>

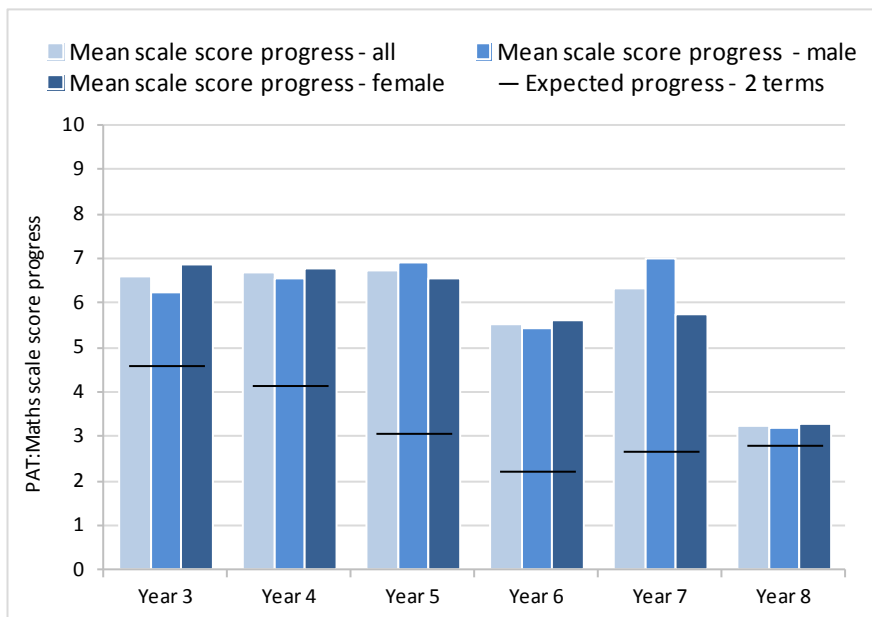
### *Progress by year*

Students' progress at Years 5, 6 and 7 was more than double that expected for two terms. At Years 3 and 4, progress was approximately one and a half times that expected for two terms. Students in Year 8 made the least amount of progress; however progress over the 10-15 week intervention was still greater than that expected progress for two terms.

### *Progress by year and gender*

As Figure 1 shows, males and females show similar progress across the year levels. The biggest difference between males' and females' achievement was at Year 7, where the average progress of males was more than one scale score point greater than that of females.

**Figure 1: Mean PAT: Mathematics scale score progress at each year level by gender**



### *Progress by year and ethnicity*

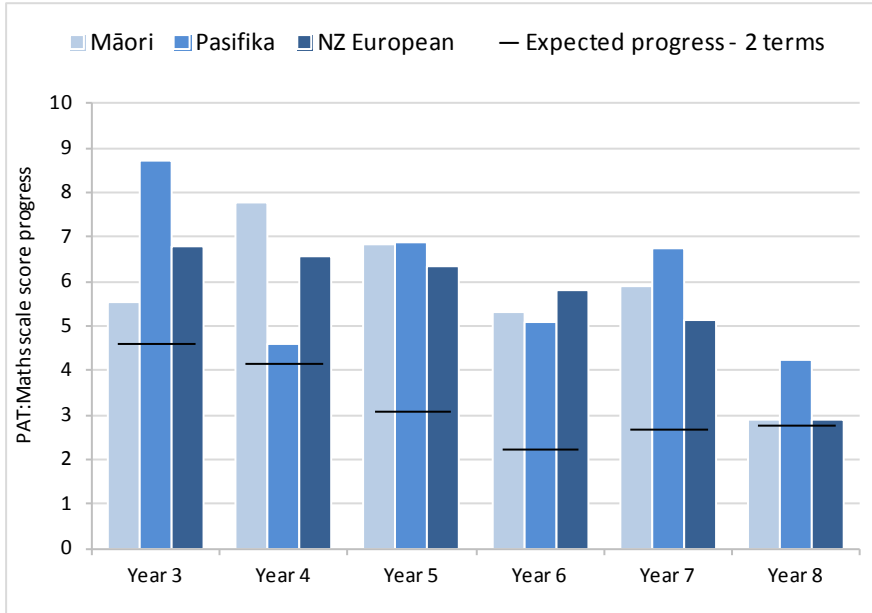
Progress measures become less reliable as sample sizes become smaller. The Pasifika sample in Years 3, 4 and 8 were small. However, across Years 5, 6 and 7 there do appear to be similar patterns of progress across all ethnic groups.

As shown in Figure 2, for each ethnic group, at each year level, students' progress exceeds expected progress for two terms, even though the programme ran for around one term. For each ethnic group the lowest amount of growth was in Year 8 (although the numbers are low, so these results need to be interpreted with caution).

<sup>17</sup> Expected progress is based on the entire 2009 PAT: Mathematics norming data set, and not split by demographic characteristics such as gender or ethnic group. This means that in the following figures, all sub-groups are being compared to norms for the wider population. It was calculated by finding the difference in means between year levels and then dividing those differences by four to represent expected progress across one term, and by two to represent expected progress across two terms.

The most notable differences was at Year 4, where progress ranges from 4.6 scale score points for the Pasifika group, to 7.8 scale score points for the Māori group.

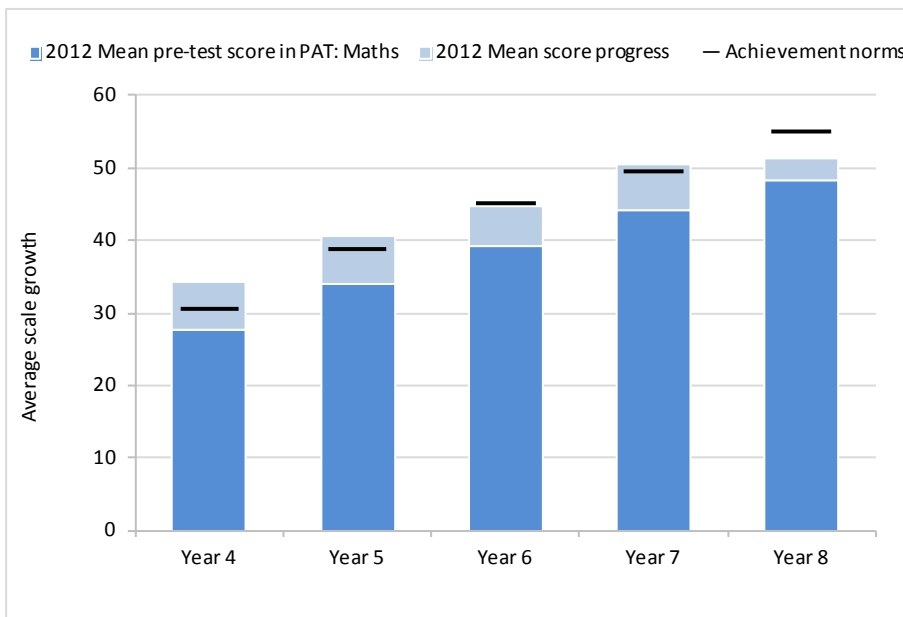
**Figure 2: Mean PAT: Mathematics scale score progress at each year level by ethnicity**



*Progress in relation to PAT year level achievement norms*

Figure 3 below shows that all students began the ALiM programme below the PAT: Mathematics achievement norms for their year level. Over the programme, scores for students in Years 4, 5 and 7 rose to above the achievement norms for their year<sup>18</sup>. Students in Year 6 were just below the achievement norms and students in Year 8 were still below the achievement norms after the programme.

**Figure 3: Scale score after ALiM compared to PAT norms**



<sup>18</sup> Note that norming data were collected in March, whereas ALiM test results were collected throughout the year. Students tested later in the year could be expected to have made more progress against the norms.

### Global Strategy Score (GloSS) data

ALiM pre and post programme GloSS assessment data were supplied by 230 schools for 2,656 students. In addition, end of year GloSS assessment data were supplied for 1,543 students.

Two-thirds (66%) of the students were in Years 4-6. There were slightly more female students (54%) than male students (46%). Just under half (44%) of the students were identified as NZ European and one third (34%) of the students were identified as Māori.

**Table 6: Data used in the GloSS analysis of ALiM**

		N	%
Schools		230	-
Students		2,656	-
Gender	Male	1,215	46%
	Female	1,441	54%
Ethnicity	Māori	902	34%
	Pasifika	344	13%
	NZ European	1,168	44%
	Other	242	9%
Year level	0-1	47	2%
	2	155	6%
	3	279	11%
	4	706	27%
	5	511	19%
	6	518	20%
	7	272	10%
	8	168	6%

### *GloSS student progress*

Schools were asked to record GloSS assessment data for the stages on the Numeracy Framework<sup>19</sup> pre- and post-programme. A third assessment was also gathered towards the end of 2012, where possible, sometime after students had stopped receiving the ALiM programme.

The majority of students (63%) made progress of at least one stage on the Number Framework during the programme. This figure was similar for male (62%) and female (64%) students. About a third of students (34%) remained at the same stage at the end of the programme, however progress within the stage may still have been made. Three percent of students were at a lower stage post programme.

### *GloSS student progress measured by a generated score*

The levels of the Number Framework are not linear<sup>20</sup>; i.e. progression through the earlier stages of the framework is easier than the later stages. To account for this, progress of students was analysed using a generated scale score. The score was generated by allocating a number to each of the stages in GloSS following the methodology described in Neill and Hodgen<sup>21</sup> (2011). The relationship between the Number Framework stage and the generated score is shown in

<sup>19</sup> Thomas, G., Tagg, A., and Ward, J. (2002). An evaluation of the Early Numeracy Project 2001. Wellington: Ministry of Education.

<sup>20</sup> Thomas, G., Tagg, A., and Ward, J. (2002). An evaluation of the Early Numeracy Project 2001. Wellington: Ministry of Education.

<sup>21</sup> Neill, A. and Hodgen, E. (2011). Exploring Mathematics Interventions: Further results from an exploratory evaluation of the Accelerating Learning in Mathematics pilot study. Report to the Ministry of Education (unpublished).



Table 7 below. While the generated score is not technically a scale score; it does allow for comparison of movement across the Number Framework as the stages are different sizes.

**Table 7: Number Framework stages and generated scale scores**

Number Framework stage	1	2	3	4	5	6	7
Generated scale score	0.5	1	1.5	3	6	10	14
Year level	Year 1	Year 1	Year 1	Year 2	Years 3 & 4	Years 5 & 6	Years 7 & 8

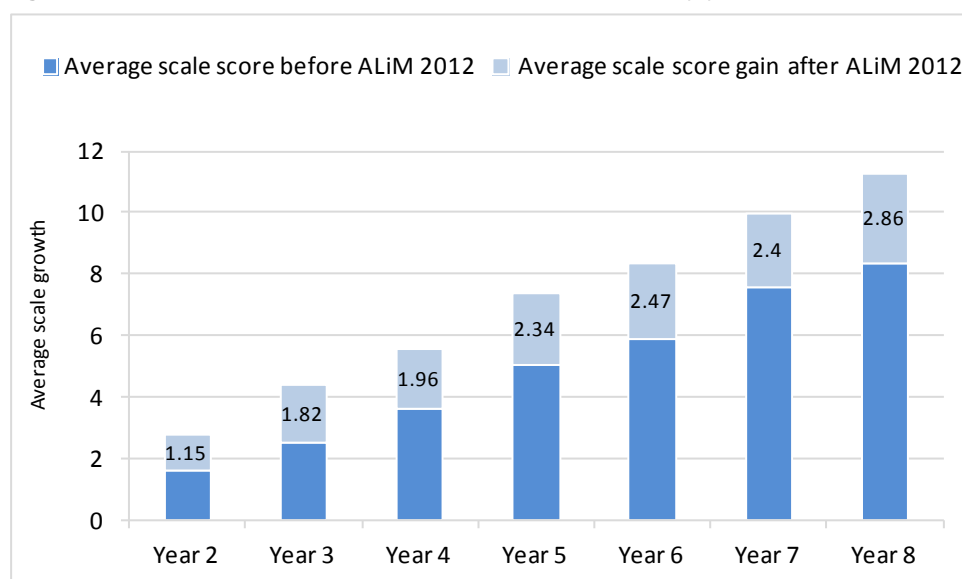
#### *Pre and post programme change by year level*

In the analysis below, students' progress was compared against the generated scale score progress of about 2 scale points each year from school entry to the end of Year 9. Students who are on track with National Standards are expected to gain 2 generated scale points per year.

Overall the average generated score for students in the ALiM programme was 2.16 suggesting students made slightly more than one year of progress during the 10 week intervention. Male (2.19) and female (2.13) students made similar progress.

Figure 4 shows that, on average, ALiM students in Years 5 to 8 made more than a year's progress in mathematics; and, on average ALiM students in Years 3 to 4 made nearly a year's progress.

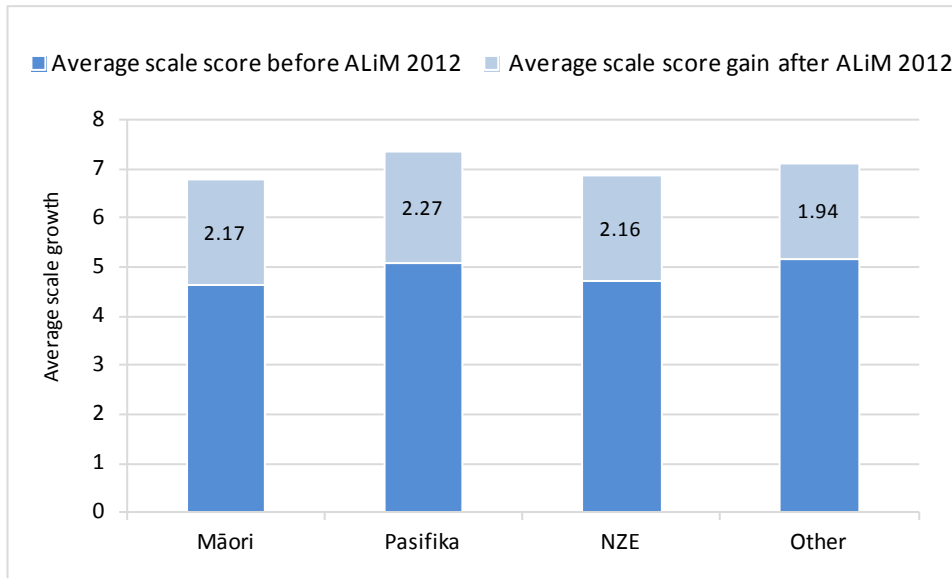
**Figure 4: Generated scale score before and after ALiM by year level**



#### *Pre and post programme change by ethnicity*

As shown in Figure 5 Pasifika students made the largest scale score gains on average (2.27) during the programme, suggesting students were making over a year's progress during the one term programme. Māori and New Zealand European students also made progress over a year.

**Figure 5: Scale score before and after ALiM by ethnicity**



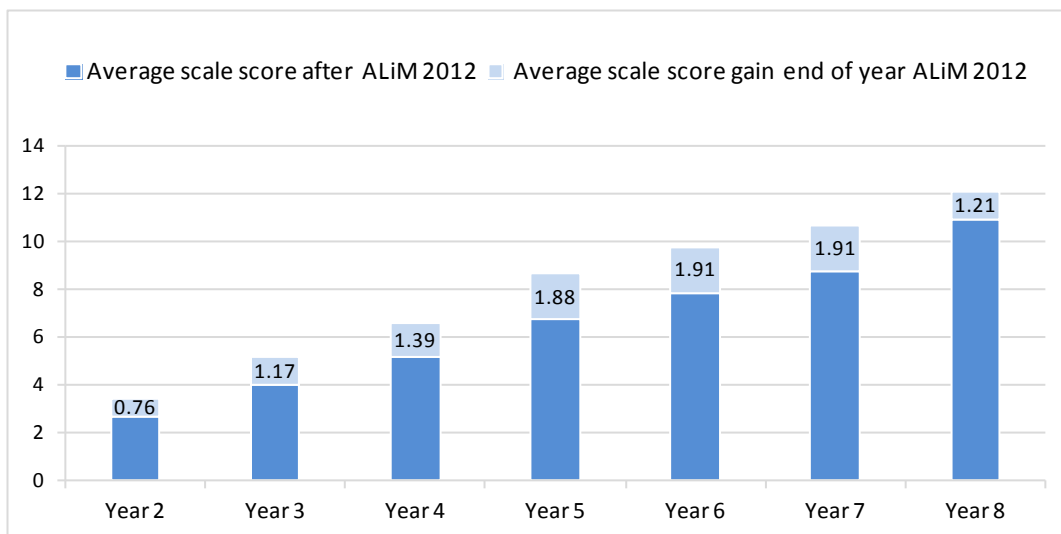
*Post programme and end of year change*

Looking at the progress on the Number Framework stages between the end of the programme and the end of 2012 provides an indication of progress after the student stopped receiving additional support. End of year data were provided for 1,543 students (58% of the students with pre- and post- programme data).

Just under half (46%) the students, progressed at least one stage between the end of the programme and the end of the year, half (50%) the students stayed at the same stage and four percent were at a lower stage at the end of the year.

At all year levels progress between the end of the programme and the end of the year (shown in Figure 6), was lower than pre- and post- programme (shown in Figure 5). However on average, students in most year levels were still making more than the progress expected in the timeframe. Students in Years 5, 6 and 7 made the amount of progress that would be expected in around one year. The amount of time from the end of the programme and the end of the year varied but would have been between one and two terms.

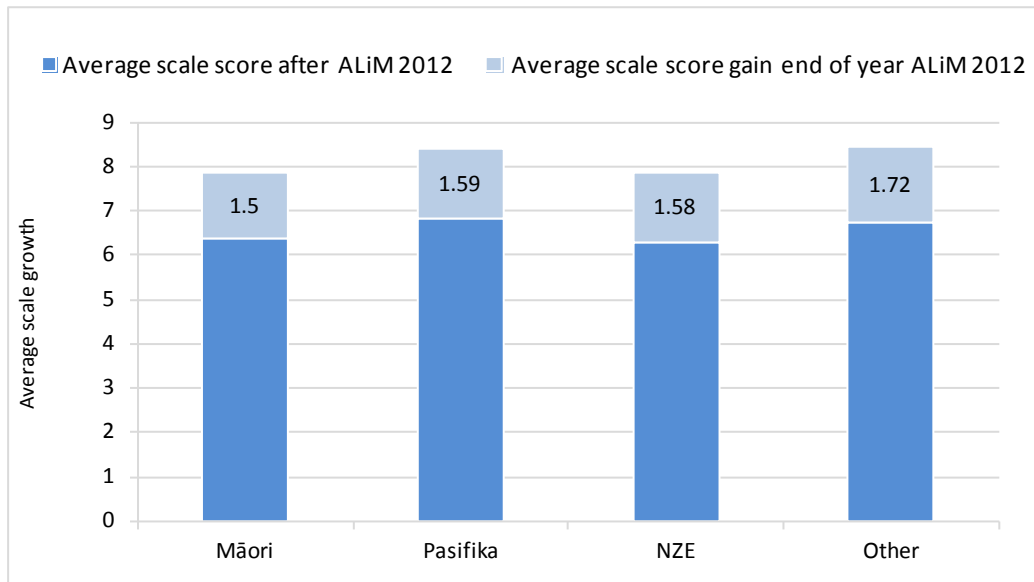
**Figure 6: Scale score at the end of the year by year level**



### *Student achievement post programme and end of year change by ethnicity*

Gains for each ethnicity were smaller between the end of the programme and the end of the year than during the programme. Students from other ethnicities made the largest scale score gains on average (1.72) between the end of the programme and the end of the year. Māori, Pasifika and New Zealand students made similar progress between the end of the programme and the end of the year of around 1.5 years of progress.

**Figure 7: Scale score at the end of the year by ethnicity**



## Accelerated Learning in Literacy (ALL)

### Description

The ALL programme uses expertise within a school to carry out a short-term intervention to accelerate the progress of students achieving below or well-below the National Standards in reading and writing. The programme is in addition to effective classroom teaching. Schools chose to focus on reading or writing, depending on the needs of their students. In 2012 most schools focused on writing.

### ALL Outcome analysis

To assess student progress and achievement in ALL teachers were asked to conduct pre- and post- programme assessments using one of a range of measures depending on the focus of the programme and the age of the students. The measures and the number of students with analysed data are listed in the table below.

In 2012, 307 schools participated in ALL, 80 schools provided data for junior literacy programmes and 135 schools provided data for writing programmes. Data from the STAR reading programmes were not able to be analysed due to the lack of clarification of the version of the test used.

Data were supplied by fewer than half of the schools and some of the data provided contained inconsistencies and missing data. Due to this the results for the 2012 literacy programmes are considered indicative only, particularly for junior literacy.

**Table 8: Outcome measures used in ALL**

Programme	Assessment tool	Data available	
		Number of students	Number of schools
Writing	e-asTTle Writing	1145	135
Junior Literacy	Colour Wheel text level	532	80
	Observation Survey– writing	80	80
	Observation Survey– Hearing & Recording Sounds in Words	75	80
	Observation Survey– Letter Identification	84	80
	Observation Survey– Concepts about print	84	80

### Overall results of ALL in 2012

- The increases in mean e-asTTle score from pre- to post-programme shows, on average, students from all year levels made more than expected progress over the programme.
- Scores on e-asTTle writing assessment increased by an average of 120 points, suggesting an increase of one curriculum level over the course of the programme.
- Students in Years 3-8 on the writing programmes overall made more than expected progress.
- Students in all years made progress on e-asTTle and were close to but did not quite reach end of year expectations.
- In the Junior Literacy programmes (Years 1, 2 and 3)
  - 94 percent of students gained at least one text level on the Colour Wheel and 33 percent of students gained 6 or more text levels.

- The majority of students made progress of at least one stanine during the programme. The majority of students were at stanine 5 or above for each component measured at the end of the programme.

The ALL assessment data is presented in two sections; writing and junior literacy.

### E-asTTle writing data

ALL e-asTTle pre- and post-programme data were supplied by 135 schools for 1,145 individual students. Demographic information was available for 1,070 students. Nearly three quarters (69%) of students were in Years 4-6 and 65 percent of the students were male. Over half (52%) of the students were identified as NZ European/Pākehā, nearly one-third (30%) of the students were identified as Māori and ten percent were identified as Pasifika..

**Table 9: Data used in e-asTTle writing analysis**

		N	%
Schools		135	-
Students		1,070	-
Gender	Male	696	65%
	Female	360	34%
Ethnicity	Māori	322	30%
	Pasifika	107	10%
	NZ European	552	52%
	Other	89	8%
Year level	0-1	0	0
	2	0	0
	3	48	4%
	4	233	22%
	5	254	24%
	6	243	23%
	7	150	14%
	8	122	11%

### *E-asTTle writing student progress*

Across all year groups, student progress as measured by e-asTTle writing was in excess of expected progress for one year, even though the programme duration was around one term.

Figure 8 below shows the mean pre and post assessment e-asTTle scores alongside the expected progress for two and three terms and over a year. Expected progress is based on data from the e-asTTle normed data set<sup>22</sup>.

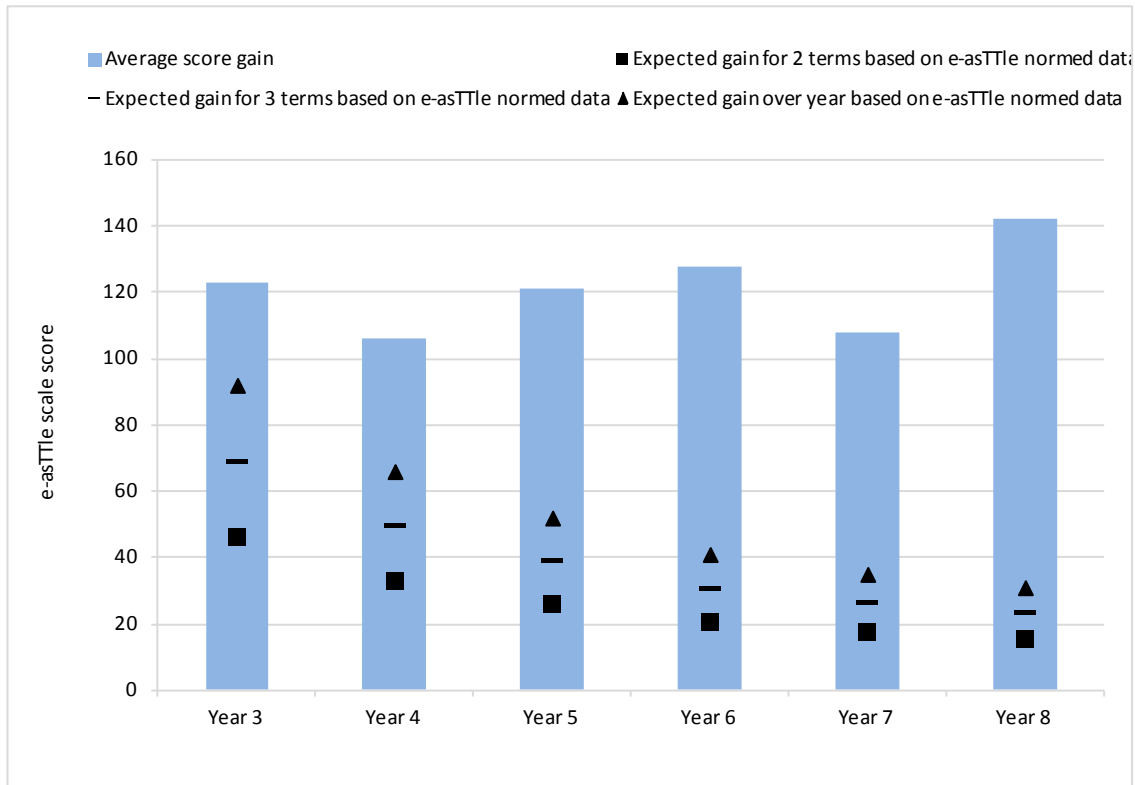
### *Progress by year level*

The average e-asTTle progress score pre- and post- programme was 120 scale points. Students participating in the writing programmes made progress over what would be expected in a year. The amount of progress made equates to around 1 curriculum level (116 scale points). Average progress was similar across year levels and ranged from 106 in Year 4 to 142 in Year 8. Pre- and post- assessment score increases were highest in Years 3, 5, 6 and 8.

<sup>22</sup> Expected norm scale (aws) scores are listed in the 2012 e-asTTle writing (revised) manual and based on the entire norming data set. Norming data used was collected in Quarter 3, whereas e-asTTle writing test results were collected at different times during the year. Students tested earlier (or later) in the year could be expected to have made less (or more) progress against the norms.

Figure 8 below shows the mean pre- and post-programme assessment e-asTTle scores alongside the expected progress for two and three terms and over a year. Expected progress is based on data from the e-asTTle normed data set<sup>23</sup>. Average progress for students from all years was greater than the e-asTTle norm expectations for one year. The amount of gain in the normed data decreases as the year level increase but the data from ALL students does not follow the same pattern. Progress made by ALL students over the one term programme was more than expected for one year. Students in Years 5, 6 and 7 made progress over double the year expectation and for Year 8 ALL students made progress over 4 times greater than the expected progress.

**Figure 8: Progress made on e-asTTle writing compared to norm expectations**



#### *Progress by gender*

Male students made slightly more progress (125) on e-asTTle on average than female students (110) over the programme. Male student's pre programme assessment scores tended to be lower than the female students.

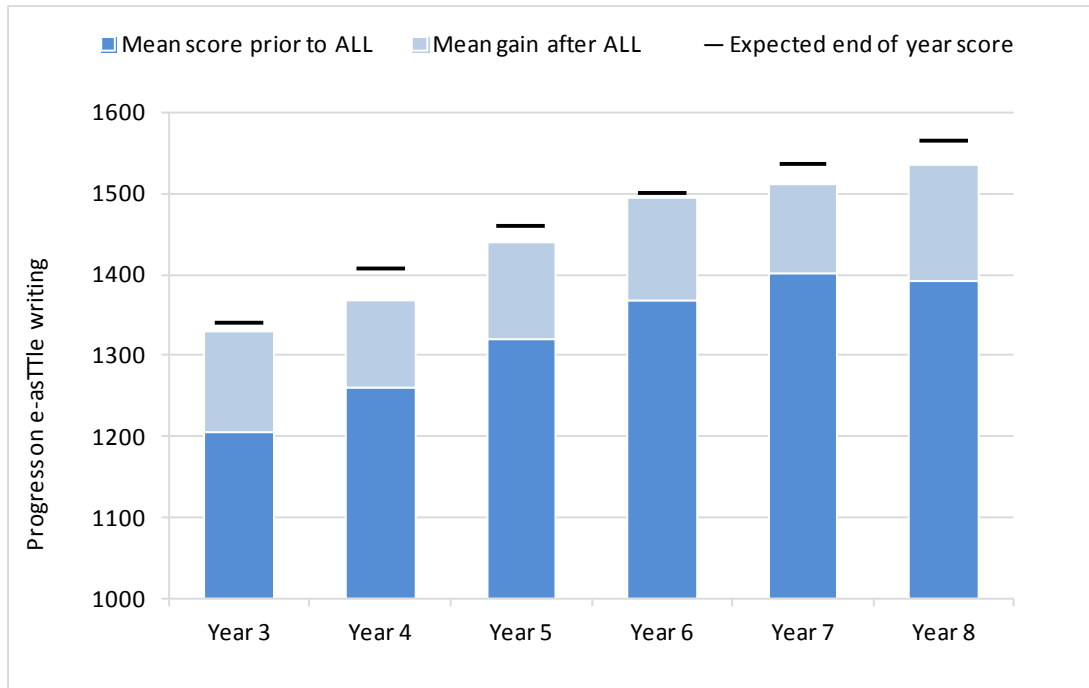
#### *Progress by ethnicity*

Māori students (128) and Pasifika students (131) made the largest before and after programme increases in scores on average during the programme. New Zealand European (116) students made slightly lower gains.

#### *Progress in relation to year level expectations*

Students in all years made large amount of progress as measured by e-asTTle scores after the ALL programme. Figure 9 below shows students were close to but did not quite reach end of year expectations. Scores after the programme were between 5 and 40 points below the end of year expected score. However the ALL programmes did not finish at the end of the year so students could have made further progress following their return to the classroom.

<sup>23</sup> Expected norm scale (aws) scores are listed in the 2012 e-asTTle writing (revised) manual and based on the entire norming data set. Norming data used was collected in Quarter 3, whereas e-asTTle writing test results were collected at different times during the year. Students tested earlier (or later) in the year could be expected to have made less (or more) progress against the norms.

**Figure 9: Progress made in e-asTTle writing compared to year expectations**

## Junior Literacy assessment data

### Observation Survey data and progress on the colour wheel

ALL pre and post programme Observation Survey data were supplied by 80 schools completing the junior literacy programmes. Teachers from those schools supplied data for five components of the Observation Survey for around 80 students and the progress made by 532 individual junior literacy students using the Ready to Read Colour Wheel.

Demographic data for these students was not provided.

### Progress using components of the Observation Survey

Five components of the Observation Survey were used to assess progress of Junior Literacy students on the ALL programmes; Writing Vocabulary, Hearing and Recording Sounds in Word, Letter Identification, Concepts about Print and Clay Word Reading. Pre- and post-programme scores were provided for each assessment. The majority of students met or exceeded the expected stanine for each component following the programme, suggesting students had reached expected levels by the end of the programme. The expected mean stanine for any student is stanine 5 on each component. Table 10 below shows the number and percentage of students at or above the mean stanine (5) for each component at the end of the programme.

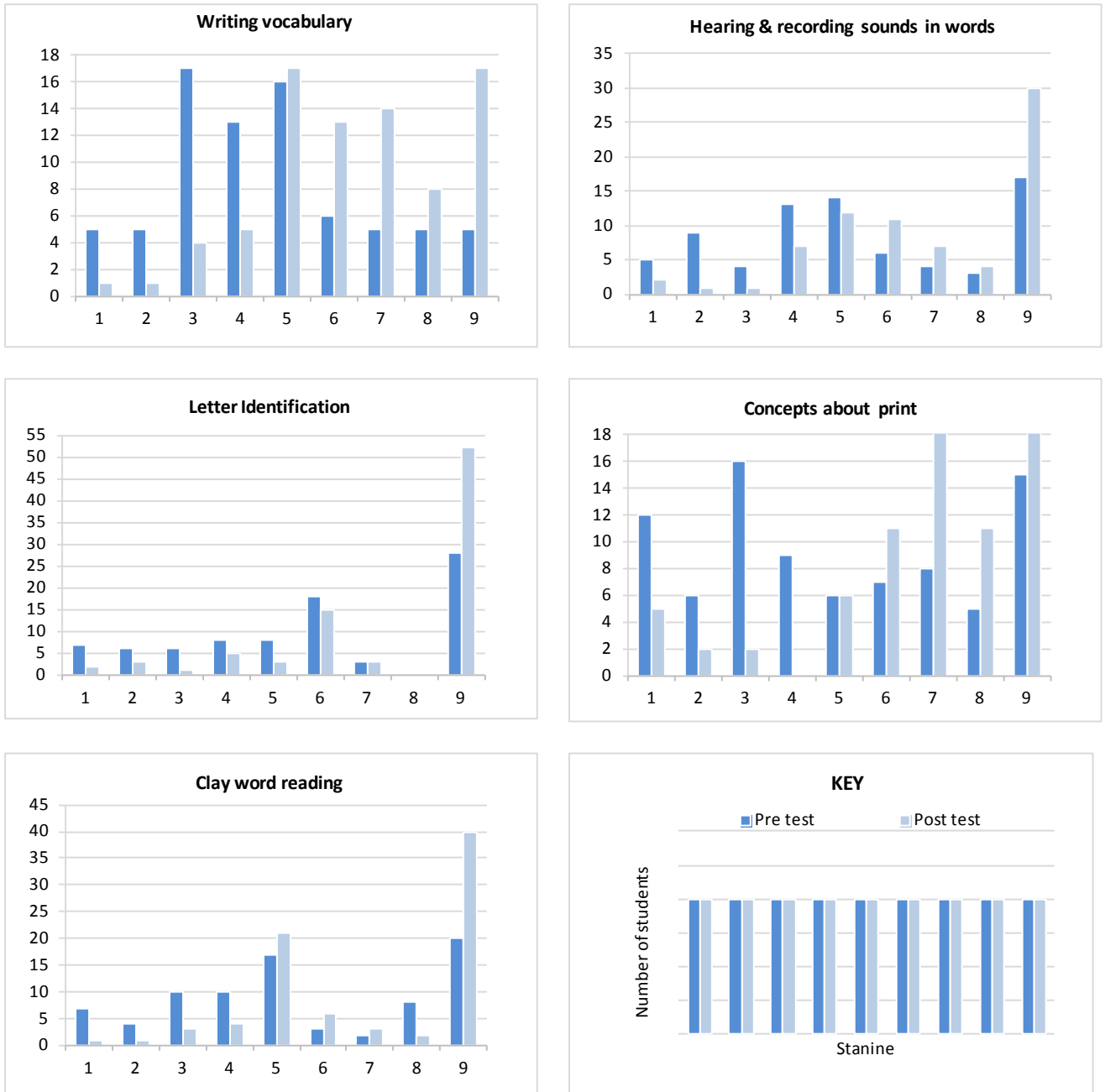
**Table 10: Observation Survey results**

Observation Survey Component	Students with data n=	Students at stanine 5 or above			
		Pre		Post	
		n	%	n	%
Writing Vocabulary	80	37	46	69	86
Hearing and Recording Sounds in Words	75	44	59	64	85
Letter Identification	84	57	68	73	87
Concepts about Print	84	41	49	75	89
Clay Word Reading	81	50	62	72	89



The improvements in stanine pre and post programme for each subtest of the Observation Survey are shown in the graphs below can be seen in Figure 10 below.

**Figure 10: Progress made as measured by Observation Survey components**



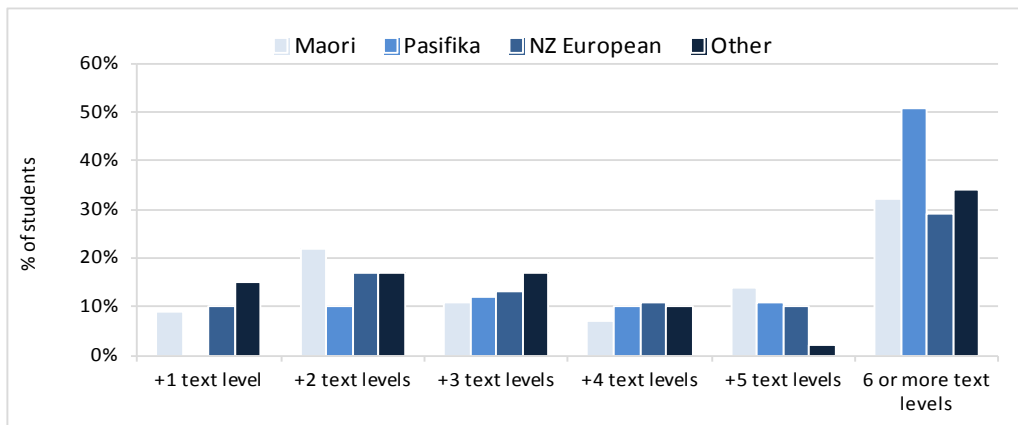
**Progress using the Ready to Read Colour Wheel<sup>24</sup>**

Nearly all students (94%) made progress of at least one level of the colour wheel over the programme. For those at the lower end of the colour wheel this would be expected progress but for those further on (Orange and above) this would be more than expected progress for one term.

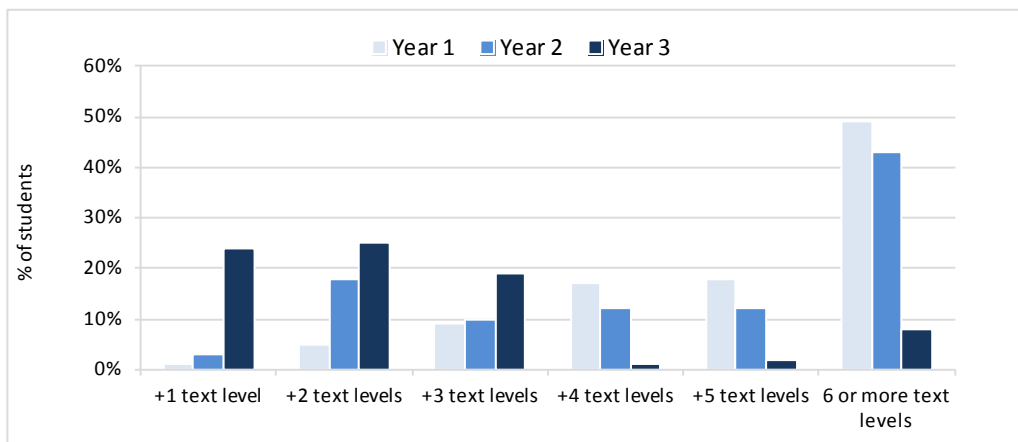
One third of students made progress of six or more levels on the colour wheel. Male and female students made similar progress.

As shown in the following graphs, Pasifika students and students in Year 1 had the highest proportions of students gaining 6 or more text levels during the programme.

**Figure 11: Progress made using the Colour Wheel by ethnicity**



**Figure 12: Progress made using the Colour Wheel by year level**



The data provided shows the progress made but does not show whether students reached the expected level for their year during the programme as their starting point is not known.

<sup>24</sup> <http://literacyonline.tki.org.nz/Literacy-Online/Teacher-needs/Instructional-Series/Ready-to-Read/Guided-reading-texts>

# The Mathematics Support Teacher (MST) Programme

## Study 2 - The Mathematics Support Teacher (MST) programme

- How did the Mathematics Support Teacher (MST) programme operate in schools during the first six months of implementation?
- What progress did students involved in the MST programme make?

### Introduction

The Mathematics Support Teacher (MST) programme was introduced in 2012. The programme provides release time for a teacher to work with groups of students who are well-below the expected National Standard in mathematics and alongside class room teachers to target students working below the expected National Standard within their class programmes.

The MST role is funded partly by the Ministry of Education and partly by the school. The amount of release time (approximately 0.5 FTE) is dependent on the decile and/or size of the school. Mentoring support is provided by mathematics facilitators and the MST is expected to undertake two post-graduate papers over two years.

### 2012 MST programme

Seventy-six schools participated in the programme in 2012. Most MST schools were Year 1 to 6 primary schools (59%) or Year 1 to 8 primary schools (32%), eight percent were intermediate schools. The majority (81%) of the 2012 MST schools were decile 1-2 schools (39%) or decile 3-4 schools (42%).

### 2012 exploratory research

The MST exploratory research aimed to understand how the new programme was operating in schools, the progress made by students and the overall sustainability of the model. The information was used to inform the development of the 2013 programme. The research questions were:

1. How did the Mathematics Support Teacher (MST) programme operate in schools during the first six months of implementation?
2. What progress did students involved in the MST programme make over the first year?
3. To what extent are the MST models implemented in schools sustainable?

This section of the report mainly focuses on research questions 1 and 2. Question 3 is covered briefly in this section and also in the following section on success and sustainability.

## Methodology

To answer questions 1 and 3, qualitative data were collected using a mixed-methods approach, consisting of school visits, online surveys and facilitator interviews. The online survey was sent to each MST and each MST school principal to find out details of the organisation of the programme. Sixty-one responses were received from MSTs (84% response rate) and fifty-one responses were received from principals (71% response rate). Focus groups and interviews were conducted with six mathematics facilitators to discuss the design and implementation of the programme from their perspective.

Twelve MST schools were visited. Schools were chosen to provide diverse perspectives and experiences of the MST programme. The visits focused on the operational aspects of the programme to provide guidance for the refinement of the programme for 2013. Interviews were held with those involved with the programme and generally included the principal, the MST and members of the leadership team.

To assess students' progress (question 2), PAT and GloSS assessment data were collected pre- and post-programme. For full details on the methodology of the exploratory research please see the Methodology section.

## How the MST programme operated

### School invited or self-nominated onto the programme

The majority of schools visited were invited to participate in the programme by regional ministry staff. The remainder of the schools had approached the Ministry to participate after hearing about the programme through professional networks.

### MST schools had previously participated in ALiM

Most MST schools had previously participated in ALiM or SMT (70%, n=53) prior to joining the MST programme in 2012. Half (n=38) of the 2012 MSTs identified themselves as previously being the ALiM teacher or SMT in their school.

### Characteristics of teacher selected to be MST

Principals felt the teacher selected for the MST role was critical to the programme's success. The MST had to be able to reflect and refine their teaching practice to effectively lead the programme. The school was required to select an effective maths teacher to be the MST but the definition of effective had not been explicitly defined. Principals described the following characteristics as the important for a MST:

- strong pedagogical and content knowledge that spans the whole primary schooling
- high expectations for all students
- commitment to teaching
- confidence and have the confidence of other staff
- patience and approachability
- knowledge of the students and the school (permanent member of staff)
- use of appropriate tools and problems
- strength based, explicit teaching.

### Students selected for the programme differed

The MST was expected to work with well-below students and support other teachers to work with students below the National Standards in their class. Student selection was mainly driven by looking at the previous years' assessment data and in particular Overall Teacher Judgments (OTJs) against the National Standards in mathematics.

Principals reported demand for the MST programme exceeded supply as they had large numbers of students not meeting the mathematics National Standards in their schools. There were different approaches to manage demand and principals and MSTs held differing views about the best way to prioritise students for the programme.

Some schools worked with students who were just-below the relevant National Standard as they believed the programme would quickly move those students in terms of achievement and this would provide the motivation for both the teacher and other students. Other schools took the opposite approach and worked with students well-below the National Standard. These schools wanted to start working with the students who needed to make the most progress.

Other factors schools took into consideration when selecting students included teacher recommendations, attitude, maturity, behaviour, concentration levels, attendance and year level.

### Programme organisation differed across schools

The MST programme provided schools with a high degree of flexibility in where, how often and for how long the programme was delivered. Schools therefore adopted a variety of approaches to delivery of the programme in their schools. Details were provided in the online surveys on programme organisation. There was significant variety in:

- the total number of students they had worked with – ranging from 10 to 76 students;
- the proportion of Māori and Pasifika students on the programme;
- the number and the size of groups – ranging from 2 to 10 groups and from 1 to 15 students;
- the number and length of sessions per week – mainly at least three sessions a week of between 30 and 45 minutes per session;
- length of programme time for the student – from 10 weeks to 30 weeks;
- withdrawal or in-class programme– some schools were doing a mixture of approaches; and
- the total release time for the MST(s) (ranged from 0.1 to 0.7 FTE) and the amount funded by the Ministry.

The amount of release time the MST had accounted for some of the variability in the programme structure in schools. The other differences in programme organisation appeared to be due to the school and teacher developing a programme that catered to the needs of their students based on previous experience and facilitator advice.

Notification of acceptance onto the MST programme influenced some organisation decisions in around a quarter of schools. In these schools, decisions about staffing and class allocation had been made when schools were informed of their acceptance onto the programme. For many schools programme organisation would have been different if they had been notified earlier. In most cases the teacher chosen to be the MST would not have been allocated a class for 2012.

### Responsibility for a class appeared to increase workload

The MST programme provided up to 0.5 release time for a teacher. According to the survey responses around half of the MSTs also had responsibility for a class for 2012. In a few schools where the MST did not have a class they also took on other non-teaching roles (eg Reading Recovery, Special Education Needs Coordinator).

Responsibility for a class had an impact on the programme experience and workload of the MST. MSTs that were also classroom teachers reported managing both roles was challenging. Some felt they were struggling to meet all their commitments fully. Some principals commented that their MST was finding it a challenge to juggle the paper, their class and their MST students. In a few schools some principals felt the workload was resulting in a heavy personal toll on the MST.

#### Release time management varied

Survey findings indicate the MST tended to be released by another teacher from the school taking the class (48%) or a reliever (30%). In a few schools a member of senior management released the MST (9%).

Principals and MSTs reported experiencing difficulties finding relievers with the right skills, experience and availability. Principals and teachers wanted a consistent reliever for the MST but in many cases this was not always possible. Late notification of acceptance onto the programme had made it difficult to find consistent relievers.

#### Postgraduate paper valuable

Nearly three-quarters (74%) of the MSTs were undertaking the post-graduate paper (the paper). Those who were not did not meet the University's eligibility requirements, had already completed a post-graduate qualification or did not wish to undertake the paper.

The paper was well received by MSTs and their principals. The MSTs saw it as valuable, interesting and contributing to the effectiveness of their programme. The training session in Auckland provided MSTs with an opportunity to meet and share their experiences with other MSTs. This was particularly beneficial for a few MSTs who felt slightly isolated running the programme with limited support in their school.

*It has been very appropriate for the teaching we are doing. ...Reading the research has been very interesting and relevant and although it has been challenging fitting it in it has been useful professional learning. Having the block courses in Auckland was useful not only in regard to the lecturers who were excellent, but also the contact with facilitators and other MSTs was invaluable. (MST)*

*... The post grad paper has been extremely valuable to me because the learning is directly transferrable into action in the classroom and it works in a way which is transformational for both the children and me. Being involved in the MST programme has been a highlight in my teaching career... (MST)*

For many MSTs the paper was the power behind the programme. Undertaking the paper provided the MST with real-time professional learning and development and the ability to apply the information from their readings and new strategies on their students. Many MSTs felt undertaking the post-graduate paper has made a significant contribution to their own learning and understanding of concepts.

*I am more reflective. I use mathematical language properly and model this. I have high expectations of behaviour and ability and don't jump in to save a child who is looking lost. I try to foster a perseverance and problem solving approach and don't tolerate learned helplessness. I anticipate what will happen and how children might access a task. I reflect on every lesson. I use materials that suit the task and encourage sharing, talking during mathematics is very important to me. The paper through Massey has been hugely supportive - it has made me do readings I may have otherwise have only glanced at and I credit it to the success I am having with the students I am working with. (MST)*

The content of the paper was relevant, useful and had helped to change practice by introducing different ways of working. For many teachers, participating in the paper had encouraged them to use mixed ability groups and to focus on understanding students' strengths.

*I reviewed the concept of teaching in groups and now do a lot more mixed ability grouping in my classroom. I use predominantly problem solving contexts for my lessons. I have implemented talk intensive practices into our lessons (not just maths). My students know to expect to talk about the maths and explain their thinking with a lot more detail than in the past. It has improved my assessment practices and identifying next learning steps.*  
(MST)

While overall the MSTs were extremely positive about the paper, both the qualitative research and the online surveys identified the workload involved with the paper as an issue for many teachers. MSTs felt the time to complete the assignments had not been accounted for in the release time or were unsure if the release time could be used for study. Principals also identified this as a concern in terms of ongoing resourcing for the programme and the sustainability long-term for the MST.

#### Facilitator support variable

Views on facilitator support were mixed. Each MST was expected to receive mentoring support from a facilitator during the programme. Most MSTs reported seeing their facilitator regularly, however, some had not seen them often and in a few cases the MST had not seen them face-to-face at all. Teachers and principals appeared unclear about how much support and the type of support they could access.

The facilitators acknowledged difficulties providing equal amounts of facilitation hours to all schools, particularly in areas where there was no local facilitator. The facilitators also felt it was difficult to provide equitable hours as the MSTs required differing levels of support depending on their experience and other supports available to them. This is an area the Ministry and the facilitators are continuing to work on.

### Impact of programme after first six months

#### Positive impact on students, MST, other teachers and school

Principals and MSTs reported in the surveys they had begun to observe positive changes at their school due to the programme. These positive changes were reiterated during the school visits. The principals and teachers were observing changes for students and MST teachers and in some schools these changes were also seen in additional teachers.

#### Impact on Students

Principals and MSTs were extremely positive about the impact of the MST programme on their students. In the online survey nearly all MSTs (98%) agreed the programme had made a positive difference for students in achievement and attitude. The MSTs mentioned accelerated learning (where students had moved one or more stages), better use of strategies, increased confidence in maths, positive risk-taking, increased participation and engagement, less anxiety, and students seeing themselves as mathematicians.

The following typify comments made by MSTs in the online survey:

*It has been rewarding to see some students making gains in maths knowledge and strategy development, but the most satisfying thing is to see such a positive attitude towards maths learning from students who are often very quiet and withdrawn in classroom situations. They are developing a self confidence in their own ability to solve maths problems and talk about their own ideas. This is not an overnight change but incremental. (MST)*

*It has been amazing to see the growth in understanding within all students. In the playground other students are consistently asking if they can be in one of our groups. The students that have been through the programme feel more confident in all curriculum areas and their teachers have remarked how their marks have climbed in all learning areas, especially comprehension skills. (MST)*

A positive impact on students in relation to achievement, attitude and confidence also came through strongly in responses from principals to the online survey.

*It has hugely advantaged our students in their results, their ability to talk about maths and now the overflow that affect is having back in the classrooms for teachers. (Principal)*

During the school visits teachers described changes in attitude and achievement. The changes were attributed in part to the environment created for the group of students. All the MSTs had spent time 'setting up their group' to allow students to feel safe and able to participate. The environment created for the group encouraged participation from all students by giving increased time to respond, working in small groups and focusing initially on what the students were able to do.

*The feedback from teachers has been positive... They mention that my MST students are more engaged and focused, and prepared to persevere, ask for help and willing to share their ideas. (MST)*

The MSTs focused on using maths in real life contexts and found these to be more engaging for students, for example some students were asked to calculate the amount of sand the school needed to order to re-fill the sandpit and other students were responsible for the timings for the school sports.

### Transition

When MST operated as a withdrawal programme, students needed to be effectively transitioned back to their classroom. Many of the MSTs in the qualitative research were aware of students making progress in the programme but this did not transfer to their classroom; the students were thought to be operating in two different environments. These MSTs were aware of the need to work with the classroom teachers to transition the students but were struggling to balance their time to do both. MSTs also wanted to balance the need to start new groups and to monitor the old group. Many MSTs mentioned transition as an area they would work on and was also expected to be covered in the paper.

### Impact on MST

Almost all MSTs (95%) acknowledged they had changed their practice and increased their knowledge and confidence as a result of becoming the MST. Nearly two-thirds of MSTs thought it has been a significant positive change while close to a third felt there had been some positive change.

MSTs reported through the survey and the qualitative research a range of specific changes in their own teaching practice as a result of involvement with MST including:

- increased teaching to the learner (teach from where they are starting from) / increased responsiveness and flexibility (not just sticking to the lesson plan)



- learning to do less and to do it better (narrow the focus) / engaging in more focused teaching
- getting students to think mathematically and to explain their thinking
- demanding mathematical talk and promoting discussion
- giving students more time to think and process
- encouraging students to take risks and to get things wrong
- requiring all students to participate
- increased use of assessment data to drive teaching practice
- asking students to solve problems themselves and using 'real world' problems and 'rich differentiated' tasks; and
- using open rather than closed questions / listening to all responses.

For many MSTs their involvement in the programme had also resulted in increased respect from other staff at their school and being sought out as mathematics knowledge leaders.

*I personally have a more in depth knowledge of mathematics in general. My teaching practice has changed in that I am using the knowledge I have gained from the study in analysing the effectiveness of what I teach and also how I teach. (MST)*

*This programme has been worthwhile for me personally as a teacher ...I am able to share these new ideas and thoughts with the staff at my school and hopefully they are taking on board these new ideas. (MST)*

### Impact on the school

Nearly three-quarters (72%) of the MSTs in the survey agreed the programme had a positive influence on other teachers in the school. The visits to the schools reflected this with both principals and teachers reporting changes to mathematics teaching through MSTs sharing their knowledge and working with other teachers. Some principals noted in the visits that teacher expectations of students had changed; with teachers now having higher expectations for all students because they had seen the progress made by students on the MST programme.

In many cases schools had replicated the high-trust environments created for the students for teachers. This environment allowed teachers to feel confident about acknowledging gaps in their own knowledge and seeking help with particular students or areas of teaching. This led to teachers being open to having their classroom practice observed and critiqued. Principals in particular spoke to the increased use of assessment data and of inquiry teaching approaches.

Many MSTs set up formal or informal sessions with other teachers about strategies they had been using with their students and to show the progress students were making. Some MSTs had been working closely with other teachers using modelling and observations, promoting the use of data and a teacher inquiry approach. In a few schools the MSTs were supporting other teachers to run ALiM style programmes. The MSTs would act as the mentor for the other teachers to help them work with small groups of students within their classroom.

Schools who had previously participated in ALiM found they could build on that experience to widen the reach of the MST programme. Most principals and MSTs noted that participation in ALiM and then the MST programme had raised the profile and status of mathematics in the school. In some cases awards, certificates and sessions focused on maths (e.g. *mathletics* or *math-a-thons*, parent information sessions) had been introduced.

A quarter of principals reported through the survey the MST programme was having a positive impact at the school level. The majority of principals also reported that participation in the MST programme is informing their planning for their mathematics programme for 2013 onwards. Around half of the principals said in the online survey the most valuable things about the MST programme was the positive impact on other teachers through increased use of data and improved teaching.

## MST outcome analysis

To assess student progress in the MST programme, teachers were asked to conduct pre and post programme assessments using PAT: Mathematics and GloSS.

### Data used in the analysis

The table below shows the number of schools and students in the student achievement analysis of MST data in this section. There were 76 schools involved in MST in 2012. PAT data were supplied by 66 schools; GloSS data were supplied by 71 schools.

Around 90 percent of MST schools provided PAT data (87%) and GloSS data (93%) that could be used in the analysis.

**Table 11: Number of schools and students providing MST data**

2012	MST	
Number of participating schools <sup>25</sup>	76	
Measures used in the outcome analysis	<b>PAT:Maths</b>	<b>GloSS</b>
Number of schools providing matched (pre and post) data for students <sup>26</sup>	66	71
Proportion of participating schools in the analysis of matched data	87%	93%
Number of students included in the outcome analyses	1,603	2,557

### Overall results of MST in 2012

- MST students generally show accelerated progress during the programme.
- Across all year groups student progress scores as measured using PAT were in excess of expectations for two terms
- There are similar patterns of growth across all ethnic groups, with some variation amongst the ethnic groups at Year 3 and Year 8. However, analysis by ethnicity should be treated with caution given the small numbers of students in some groups.
- Male and female MST students show mean progress above what is expected over two terms in Year levels 3 to 7. At Year 8, only male students' mean progress is above the expected progress for two terms.

### PAT: Mathematics data

PAT data were supplied by 66 schools for 1,603 MST students. Two-thirds of students (66%) were in Years 4-6 and 51 percent were female. The largest proportion of MST students identified as Māori (42%), under a third of students identified as New Zealand/European/Pākehā (29%) and a fifth (21%) identified as Pasifika.

<sup>25</sup> Source: Ministry of Education PfS participation statistics 2013

<sup>26</sup> Source: NZCER & NZMaths reports

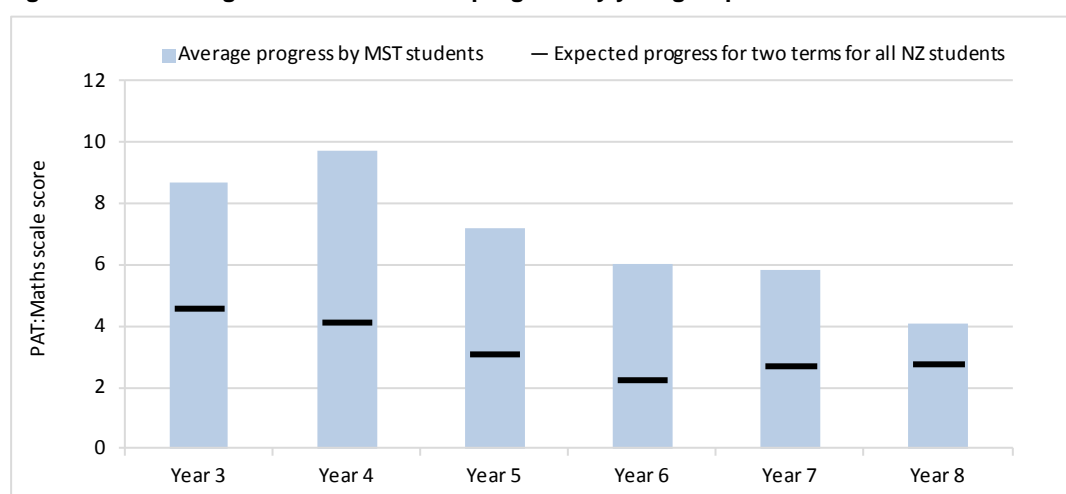
**Table 12: Data used in PAT: Mathematics analysis of MST**

		Number of students	% of students
Gender	Male	791	49%
	Female	812	51%
Year level	3	229	14%
	4	381	24%
	5	404	25%
	6	277	17%
	7	209	13%
	8	103	6%
Ethnic group	Māori	670	42%
	Pasifika	344	21%
	NZ European	464	29%
	Other	84	5%
	Unknown	85	5%
<b>Total</b>		<b>1,603</b>	<b>100%</b>

### *Progress by Year*

Across all year groups student progress scores as measured using PAT were above expectations for two terms (Figure 1). The majority of MST students were taught for around 20 weeks but some were taught for shorter or longer periods.

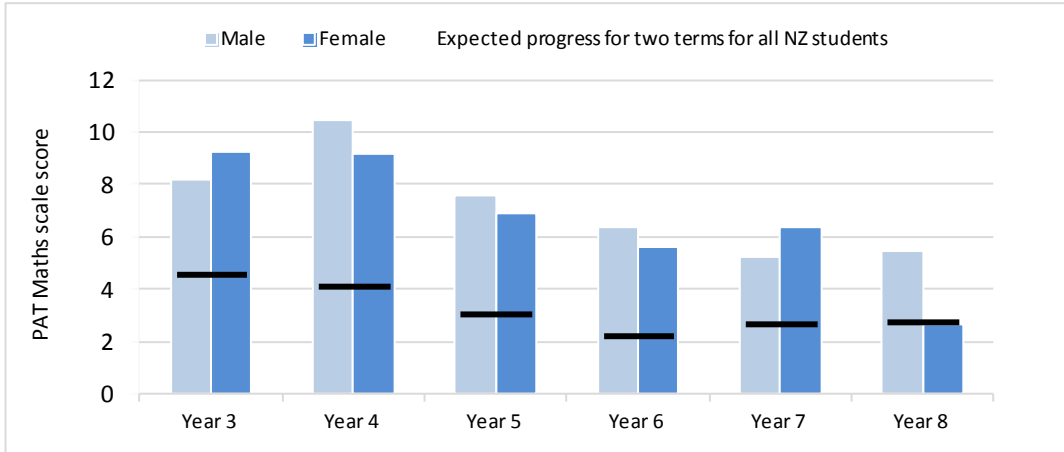
In Years 4-7 the average progress score was more than double the score expected over two terms. The progress for Year 3 students was just below double the score expected over two terms. Actual progress shown by the students shows a pattern similar to expected progress, with mean progress being greater at the lower year levels. However, while the MST student's mean progress decreases in Years 6 to 8, the reference group (the normed data) shows a slight increase in progress across this period. Progress was greatest among Year 4 students who participated in MST, while the reference group (normed data) shows greatest progress at Year 3.

**Figure 13: Average PAT: Mathematics progress by year group**

*Progress by year and gender*

Across all year levels, male MST students had mean progress above expected over two terms. Female MST students' mean progress was also above the expected progress for two terms at all year levels except Year 8.

**Figure 14: Progress made in PAT: Mathematics after MST by year level and gender**

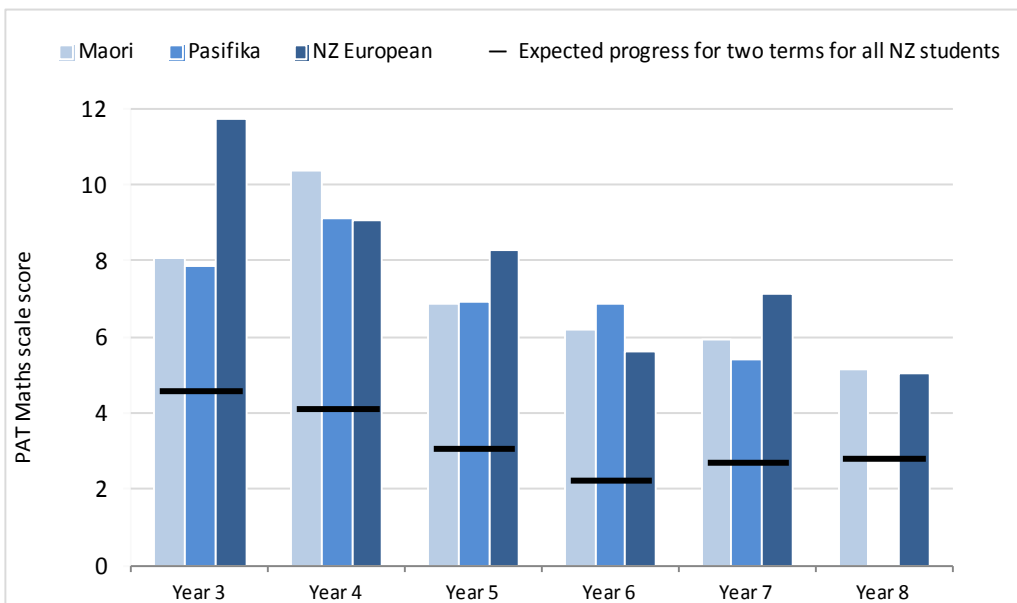


*Progress by year and ethnicity*

Progress measures become less reliable as sample sizes become smaller. When data is split by ethnicity, some groups become small, for example there are only nine Pasifika students at Year 8 so these have been removed from the graph. However, there appears to be similar patterns of growth across ethnic groups.

There is some variation amongst the ethnic groups at Year 3 with the New Zealand European group showing approximately one and a half times the mean progress of the Māori and Pasifika groups. However, there were relatively few Year 3 students and the small numbers together with large standard errors mean any inferences should be made with caution.

**Figure 15: Progress made in PAT: Mathematics after MST by year level and ethnicity**



### Global Strategy Score (GloSS) data

GloSS data were supplied by 71 schools for 2,557 MST students. Three-quarters of students (76%) were in Years 3-6 and there were equal proportions of males (50%) and females (50%). The largest proportion of MST students was identified as Māori (39%), a third of students were identified as New Zealand/European/Pākehā (33%) and a fifth (20%) were identified as Pasifika.

**Table 11: Data used in GloSS analysis of MST**

		Number of students	% of students
Gender	Male	1,276	50%
	Female	1,281	50%
Ethnicity	Maori	1,007	39%
	Pasifika	513	20%
	NZE	842	33%
	Other	195	8%
Year	0-1	68	3%
	2	160	6%
	3	433	17%
	4	432	17%
	5	550	22%
	6	503	20%
	7	245	10%
	8	166	6%
Decile	Low (1-3)	1,435	56%
	Medium (4-7)	1,097	43%
	High (8-10)	25	1%
<b>Total</b>		<b>2,557</b>	<b>100%</b>

### *GloSS student progress*

Schools were asked to record GloSS assessment data for the stages on the Numeracy Framework pre and post programme (approximately 20 weeks).

In 2012, the majority of students (70%) made progress of at least one stage on the framework during the programme.

### *GloSS student progress measured by a generated score*

The levels of the Number Framework are not linear<sup>27</sup>; progression through the earlier stages of the framework is easier than the later stages. To account for this, progress of students was analysed using a generated scale score. The score was generated by allocating a number to each of the stages in GloSS following the methodology described in Neill and Hodgen (2011)<sup>28</sup>. The relationship between the Number Framework stage and the generated score is shown in Table 12 below. The generated score is not technically a scale score; however, it does allow for comparison of movement across the Number Framework as the stages are different sizes.

<sup>27</sup> Thomas, G., Tagg, A., and Ward, J. (2002). An evaluation of the Early Numeracy Project, 2001

<sup>28</sup> Neill, A. and Hodgen, E. (2011). Exploring Mathematics Interventions: Further results from an exploratory evaluation of the Accelerating Learning in Mathematics pilot study. Report to the Ministry of Education (unpublished).

**Table 12: Number Framework stages and assigned scale scores**

Number Framework stage	1	2	3	4	5	6	7
Scale score	0.5	1	1.5	3	6	10	14
Year level	Year 1	Year 1	Year 1	Year 2	Years 3 & 4	Years 5 & 6	Years 7 & 8

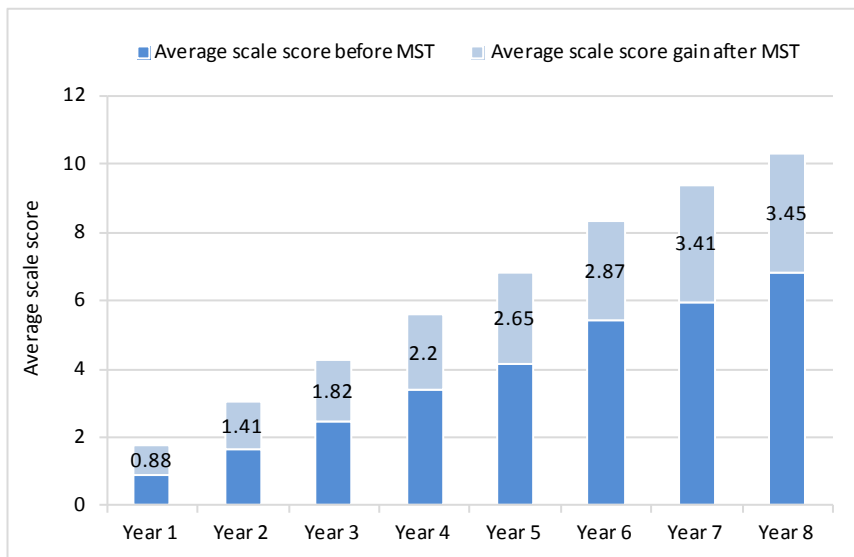
*Pre and post programme change by year level*

In the analysis below, students’ scale progress was compared against expected scale score progress of about 2 scale points each year from school entry to the end of Year 9. Students who are on track with National Standards are expected to gain 2 scale points per year.

Overall the mean generated score for students in the MST programme was 2.48 suggesting students made more than one year of progress during the 20 week intervention. Male (2.49) and female (2.46) students made similar progress.

Figure 16 shows that, on average, MST students in Year levels 4 to 8 made more than a year’s progress in mathematics.

**Figure 16: Generated scale score before and after MST programme by year level**



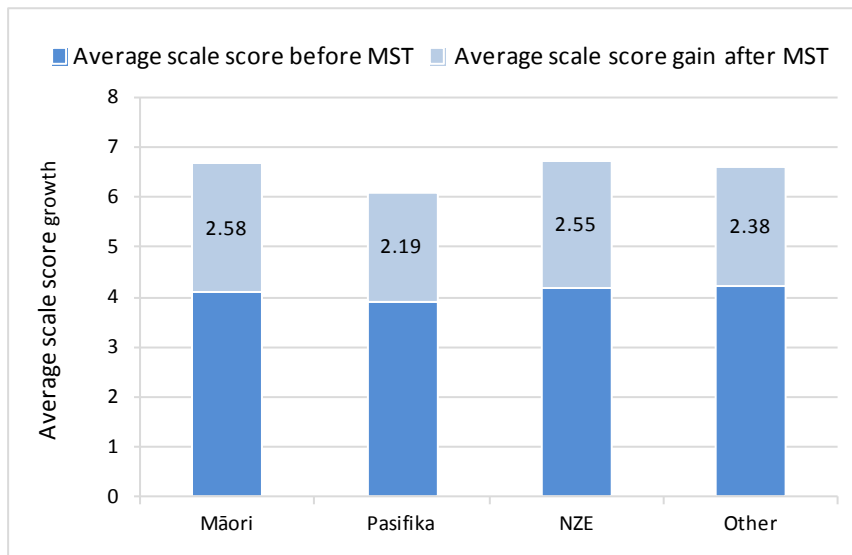
### *Pre and post programme change by gender*

Boys (2.49) and girls (2.46) made over a year's progress during the two term programme.

### *Pre and post programme change by ethnicity*

Students from all the ethnicity groups on average made over a year's progress during the programme. Māori and New Zealand European/Pākehā students made the largest gains in scale score.

**Figure 17: Scale score after MST by ethnicity**



# Factors contributing to the success and sustainability of the programmes

## Study 3 - Success and sustainability of the programmes

- What factors contributed to the success and sustainability of the programmes in schools?

The 2011 PfS evaluation and 2012 student achievement data indicate PfS are successful in accelerating student achievement over a period of 10-15 weeks. The third evaluative study in 2012 aimed to investigate what factors contribute to schools achieving success in raising student achievement and whether the changes were sustainable.

### Methodology

Visits were made to schools that participated in PfS in either 2011, 2012 or in both years. The schools were purposefully selected using a 'Success Case' methodology. This methodology assumes that looking at schools that experience success can help understand how others schools can also be successful.

Schools whose PfS programmes had successfully raised student achievement were identified by the PfS programme leaders and the facilitators. School reports and student achievement data were also reviewed. Other criteria taken into account for school selection for the study were size of school, location, ethnic composition of the school and decile.

Twenty-seven schools across the three programmes (ALL, ALIM and MST) were selected. Interviews were conducted with the key programme participants (principal, programme teacher and other key individuals) to understand how the programmes operated at each school. The interviews sought to identify the factors that supported and enabled programme success. When visiting schools the researchers also looked at whether schools were continuing their programmes or their approaches and if so, what was enabling this. For full details please see the Methodology Section.

### Success and sustainability factors

The 2011 PfS evaluation identified organisational elements that contributed to the success of the programmes. These formed the implementation parameters for the 2012 PfS programmes: regular, intensive, additional to class teaching, more than 30 minutes per session and at least 4 times per week. In 2012 schools followed these guidelines to design programmes suitable for their school to meet the needs of their students.

This 2012 study identified the following factors contributed to the success of the programmes:

- Leadership and strategic planning
- Previous participation in PfS
- Inquiry teaching
- Capability building - professional learning communities, support – mentors/advisors/coach
- Relationships – students, teacher, parents/whānau and communities
- Focus on students.

All of these factors were present in each of the schools visited to varying degrees. The following section discusses the above factors and includes examples to provide illustration of the factors in operation.



### Leadership and strategic planning

Involvement of the school leadership was key to programme success. Leadership includes the principal, the leadership team, the programme lead teacher and the Board of Trustees. BES evidence<sup>29</sup> indicates that the closer the leaders get to the core business of teaching and learning in their school the more likely they are to have a positive impact on students.

The PfS programme model in School S used layers to structure, spread and reinforce their ALL programme through the school. "There were layers of responsibility through the school, not just the management but the middle leaders as well, all driving the programme." Principal

The Ministry acknowledged the importance of principal involvement for programme success and requested the principal attend the training days prior to starting of the programme. Most principals attended the training and also the end of programme impact days with their lead teacher.

In all schools visited, the principal endorsed and supported the programmes. In some schools the Board of Trustees were also actively supporting the programme. Principal involvement depended on the school but in most cases included programme set-up, ongoing support, endorsement and resource allocation (release staff and timetabling). The involvement of the principal helped prioritise the programme within the school, make the roles and responsibilities clear and intentions of the programme explicit.

In general principals were clear their role was to support, advocate and prioritise the programme across the school. When this happened in schools the programme was more likely to be embraced by other staff members.

In a few schools visited, the student achievement goals for PfS had been included as targets in strategic planning documentation (eg the school annual plan or charter). This helped to make the programmes visible to all and outlined the school's commitment to raising student achievement through these programmes. Inclusion of the programme in these documents clarified the rationale for the school's involvement in the programme and positioned the programme within the wider school literacy or mathematics programme.

The school leadership had a firm commitment to changing academic outcomes for students who had been previously under-served by the system. This commitment was expressed in the strategic and annual plans of the school.

"Students are unable to access the curriculum and therefore would be unable to meet the standards." Principal

### Previous participation in PfS

Seventeen of the twenty-seven schools visited had previously participated in PfS. This meant the schools knew they could accelerate student progress in 10-15 weeks. Teachers felt their previous experience allowed them to narrow the focus of their programme to target particular areas and students.

Principals felt previous participation made the programme organisation, such as relief staffing and timetabling, easier to manage. Schools which had previously participated in PfS put greater emphasis on building capability the second time around, with the school often involving more teachers. Schools that had previously participated in PfS with only one teacher felt it would be difficult to sustain the programme beyond the funding without involving more teachers.

<sup>29</sup> Robinson V, Hohepa M, Lloyd C. (2009) School Leadership and Student Outcomes: Identifying What Works and Why Best Evidence Synthesis. Ministry of Education.

Previous participation allowed School C to develop a wider model to expand PfS across the school in 2012. The school successfully accelerated progress of students in ALL-writing 2011. In 2012 the school wanted to continue the inquiry approach and included every teacher in the school in their programme. The school leadership wanted to implement strategies that would have lasting results across the school. The programme lead teacher and principal developed an action plan and a strategic plan for the programme and referred to these throughout the 15 week programme.

Release time was used for planning, reflection and also for observing each other's practice. Teachers met in inquiry teams fortnightly to reflect and monitor student progress and programme effectiveness. The school incorporated an observation roster during the release days and built up trust between colleagues to share their writing practices.

The amount of progress students made in 2012 was less than in 2011 but the principal felt that the increase in confidence and attitudes of both the teachers and the students could be built on in the future leading to sustainable change. The school found real value in using their internal capacity to grow their capability and bring about longer term change.

The mathematics facilitators felt teachers who had participated in ALiM the previous year did not require as much support and guidance to get their programmes up and running as those who had not. Maths facilitators, principals and MSTs all felt previous participation in ALiM helped schools run successful MST programmes. Previous involvement influenced how schools implemented and operated their MST programmes. This included adapting teaching practice, refining group size, selecting students and managing release time.

In School M the ALiM programme had been effective in 2011 but student achievement results improved further in 2012. The difference was attributed in part to the senior leadership support and planning for the programme. The same relief teacher was placed in the class of the ALiM teacher, providing consistency for both the teacher and the class and also allowed the ALiM teacher daily contact with the ALiM class. The teacher also brought pupils back from the 2011 programme to help with the sessions and act as role models and also check on their progress.

#### Inquiry teaching beneficial for student and teacher change<sup>30</sup>

Programme models that included multiple teachers around an inquiry question were common among the successful programmes, particularly the literacy programmes. Many schools visited had set up inquiry teams as part of their programme. The inquiry questions were unique to the school and reflected the particular need of the students at the school.

Focusing a programme around an inquiry question allowed the teachers to learn from their practice and build knowledge. The senior leaders, Principal and Deputy Principal of School S designed their ALL programme to be a vehicle to deliver an inquiry teaching model to the school. Their inquiry focused on understanding best practice in effective writing programmes for all students. All teachers were involved in the programme across the school. Leadership across the school ensured the programme was embraced and embedded by all staff. The leadership created space for the programme within the timetable. The Principal was highly involved in the programme by sharing in the teaching inquiry and providing mentoring support.

The number of people involved in the inquiry team varied by school but tended to include the senior leadership team, classroom teachers, the intervention teacher and occasionally external experts. The inquiry team were responsible for monitoring the progress of the PfS students and helping the teacher focus the inquiry on what the students needed to

<sup>30</sup> Inquiry teaching <http://nzcurriculum.tki.org.nz/Curriculum-stories/Case-studies/Teachers-as-learners-Inquiry/Teaching-as-inquiry>

learn and how the teacher could enable that. By adopting this approach teachers were able to shift their focus from what students didn't know to understanding what they did know and what the next learning steps should be.

Inquiry teams were often also responsible for supporting and mentoring the intervention teachers. This involved regular meetings with the teachers to discuss students' progress, observations and providing feedback and organising staff meetings to share programme developments.

In many schools the inquiry teaching model helped the programme to move towards becoming self-sustaining. Schools who delivered the programme through inquiry teaching found they could disseminate information across the school to more teachers. Staff and teacher syndicate meetings were often used to bring in other teachers to the inquiry and to spread the knowledge.

School O participated in ALIM in 2011 and found they could raise student achievement over short period of time. In 2012 they ran MST using an inquiry teaching approach. They focused on building teacher capability as well as raising student achievement. Their inquiry programme was deliberately set up to allow for succession planning.

Their programme included time for the MSTs to mentor other teachers. The MSTs modelled lessons, conducted observations and videoed themselves and the teachers to provide critique and learning opportunities. In the same way that the teachers created a safe environment for the students, the school leadership created a low risk-high trust environment where the teachers felt safe and supported to be observed and offer critique.

The key elements for the principal were frequency, intensity, duration and quality teaching. A proportion of the programme time was spent getting to know the strategies the students have and forming relationships. The teachers moved to focusing on the curriculum level that the student was working at rather than their year level.

*"What made the most impact and led to accelerated progress was the targeted teaching through identification of gaps, teaching inquiry and increased teacher knowledge, teacher reviewing data and the layers throughout the school."*

Principal

### Capability building through use of multiple teachers

Using and building in-house capability was important to the success and sustainability of the programmes. The PfS teacher was selected from within the school and had an ongoing relationship with staff and students. In many cases the PfS teachers earned the respect and trust of colleagues because they demonstrated success with students that had previously not been achieving within the school. This helped to develop a collective sense of responsibility for all students in the school not just those in a particular class.

School W wanted to raise their literacy and numeracy rates and made a long term plan to raise student achievement. The principal viewed embedding and sustaining the programme to raise achievement and build capability important from the beginning. The MST programme fitted well with the vision of growing capability within the school as the school wanted to create something sustainable and not reliant on one teacher.

The teachers felt PfS provided applied professional development opportunities as it was based in the school and focused on the current learning with their students. Previous participation in PfS often led schools to involve more teachers. In many cases the teacher involved the previous year was used to mentor the programme teachers the following year.

School L amended their approach the second year they participated in PfS to include more teachers. The programme had been successful in raising student achievement and changing teacher practice. However the school felt it had worked in isolation to the rest of the school and wanted the learning and growth to occur for other students and teachers and to be sustainable beyond the 15 weeks of the programme.

One of their main aims for their 2012 programme was developing professional learning relationships through inquiry teaching. They used a mix of experienced and less experienced teachers in their inquiry team to provide opportunities to grow capability in a safe environment. The programme involved three teachers who each had a target group of students within their class.

The school bought in an external literacy facilitator to observe the teaching and provided feedback. She also videoed learning conversations and played them back to staff at meetings. The teachers found this more valuable than modelling and even the experienced teachers learnt a lot from their feedback.

Their programme provided targeted teaching for students and targeted professional learning for the teachers. The teachers generally remained in their class with their target students (rather than withdrawing them) the school found the class overall benefited from the programme as well as the specific target children.

Although involving more than one teacher in a programme required consideration and organisation at the beginning, principals acknowledged that long-term change was more likely to be effective with changes to teachers' pedagogical approaches across multiple classrooms. In the successful schools there was evidence of 'opening up' of classroom practice. Over half of the schools visited organised release time to allow teachers to observe each other and to have follow-up reflection time on what they observed.

### Effective relationships

Teachers forming effective relationships with students were important to the success of the programmes. Evidence suggests effective teaching and learning depends on the relationship between teacher and student, and the active engagement and motivation of the students by the teacher<sup>31</sup>. Developing positive relationships with the students helped ensure the students were able to ask questions, provide their ideas and know their contributions would be valued. Teachers made the learning environment safe and supportive for all students. This involved setting rules around behaviour, respect and clarifying expectations at the beginning.

Teachers demanded participation from all students in their groups. They noted that in the small group setting students felt better able to offer contributions than in larger classes. The teachers acknowledged building the confidence and trust of the students was an important part of the programme and contributed to the success of the programme across all the groups. Teachers noticed 'flow-on' effects for some students as attendance improved along with participation in other areas of school.

ALL writing teachers used real life examples for activities or ensured that writing was to a real person. The teachers also talked about the value of working together as a group for example writing shared stories or group problem solving and sharing of strategies. Maths problems were also put into real life contexts the students could relate to for example one group organised the timing for the school triathlon, another group were asked to work out how much new sand was needed to fill the school sandpit.

<sup>31</sup> Nuthall, G.A. (2001). Understanding how classroom experiences shapes students' minds. *Unterrichtswissenschaft: Zeitschrift für Lernforschung*, 29,(3), 224-267.

The relationships between programme and class teachers were also important to programme success. The programme teacher needed to demonstrate the progress made within the programme to class teachers. This was particularly important for the MST schools as the MSTs initially found the students were operating in two different worlds; their MST class and their usual classroom.

School A ran an ALiM programme in 2011 and a second programme the next term, funded by the school. The school continued to run a programme similar to ALiM in 2012. The school prided itself on the relationships it formed. The programme teacher took time to know and understand their students, who they are, where they are and how to move them on if they are not where they want them to be.

The school felt the short programme was better for their student self-esteem and also their relationships with others in the classroom – both the teacher and fellow students. The school put more focus on classroom connections in 2012. Classroom teachers were encouraged to watch ALiM sessions and the ALiM teachers would go with the students back their classes and provide support.

Developing relationships with colleagues was important to success. Many schools created a safe environment for their teachers to be able to share, open up their classrooms and critique each other that reflected the environment the programme teachers had created for their students. By ‘opening-up’ their classrooms for observation and critique teachers were able to make changes to their practice.

School H built relationships internally and externally with their community. The school built on their involvement in ALL in 2011 to develop their 2012 ALL programme across the school and involved all teachers in the school identifying target students. Their vision was to spread the knowledge and change across the school.

Their approach led to improvements in student achievement and behaviour as well as improved relationships between staff, students and the community. The approach led to changes in teaching practices, stronger connections across classrooms and a shared responsibility for students.

The school used their in-house Reading Recovery teacher and external Resource Teachers of Literacy to provide the mentoring support to each teacher. The school built a high trust environment where teachers were comfortable to be observed, and in some cases videoed and critiqued. The teachers found the regular mentoring where they could discuss their thoughts and strategies a powerful part of the programme.

The school developed links with the community by setting up a Book Club. Members of the community were matched with a student who needed support and worked together for one half hour each week to read or be read to. It provided the students with an opportunity to practice their reading, listen to others read and meet members of their community. Some of these connections led to the community person building strong relationship with the students and attending assemblies involving these students.

All schools acknowledged the importance of developing relationships with family and whānau and had made attempts to engage with families and whānau to varying degrees of success. This was an area most schools felt they would need to work on further. All schools informed parents of their child’s involvement in the programme. Many schools held drop-in sessions or scheduled events for whānau and families to demonstrate what was happening in the programmes and to offer ways to support their child.

School B developed an ALL-literacy programme aimed at connecting with their students, whānau/families, using an inquiry approach. The programme supported their students, particularly Māori boys to achieve literacy success. Their approach also enabled the school to develop professional learning within the school and improve teacher capability.

Close connection between teachers and students were fostered through working in respectful partnerships. The programme teachers undertook a thorough investigation of strengths and learning needs using a range of assessment tools.

The school developed links between home and school by placing some of their targeted children on the Reading Together<sup>32</sup> programme. The school wanted to make connections with the families. Sometimes this was difficult in as the people the students were living with did not want to or did not have the time to invest due to other work or family commitments. By pursuing these connections however the teachers were able to provide strategies specific to each whānau to help support the student.

Relationships within the school were also important. Many classroom teachers were initially sceptical about gains. The programme teachers began discussions with the classroom teachers, assisting the teachers to use evidence of progress to adjust their classroom planning.

School T focused heavily on relationships, particularly with families and whānau. Principals, Board of Trustees and staff were determined to grow the children's knowledge, strategies, skills, confidence and attitude in mathematics. The school organised a whole-school maths night, with incentives for the families to attend – spot prizes and food. The ALiM teacher rang every ALiM parent and all attended. Principal and members of the Board also attended the evening.

Classroom teachers of the students were invited to observe their students in the ALiM class. Then they were encouraged to reflect on their own practice to understand what it is about their practice that was not facilitating progress to happen in their own classrooms.

### Focus on students and high expectations

Programmes were built on understanding the student and providing targeted teaching to respond to their needs. Many teachers attributed the clear focus on understanding the students as the reason for the success of the programme. The small group teaching, coupled with the reflection time and discussions with others helped teachers develop more effective instructional strategies for each student. The small group size allowed them to determine if their teaching was impacting on the student through close observation and immediately responding if the student needed more assistance.

Teachers focused on understanding students' strengths irrespective of their year level. This strategy is identified in the Best Evidence Synthesis (BES) as effective for diverse learners<sup>33</sup>. Many teachers felt being part of PfS had challenged the assumptions about their student understanding particular things. The small groups allowed them to focus on what strategies students were using and where difficulties were rather than making assumptions.

<sup>32</sup> [www.readingtogether.net.nz](http://www.readingtogether.net.nz)

<sup>33</sup> Alton-Lee, A. (2003). *Quality Teaching for Diverse Students in Schooling: Best Evidence Synthesis Iteration (BES)*. Wellington: Ministry of Education.

An important part of School O's programme was getting to know the students and building relationships with them at the beginning of the programme. The school set out to respond to the learner. The teachers spent two weeks at the beginning of the programme getting to know what knowledge and strategies the students had.

The school moved from a total withdrawal programme to a mix of withdrawal and in-class when it became apparent that gains made in the programme were not evident when the students were back in class. Taking the group within the classroom allowed observations of the MST by the classroom teacher, provided modelling opportunities and the ability to discuss pedagogy in real time with positive results.

Teachers provided students with an expectation that they would be successful in the programmes. It was common for students to be proud to be selected to be part of the programme. There was no stigma attached to being part of the group. In many schools other students wanted to know how they could be part of the group. Many teachers acknowledged that either they themselves and/or other teachers in the school had lower expectations of these students prior to the programme than they did now.

School B undertook a thorough investigation of strengths and learning needs and developed their programme to respond to these needs. The principal acknowledged that many classroom teachers were initially sceptical about the gains students had made but the visible changes proved the value of individualised learning. Part of the programme's success was that it challenged teachers' assumptions about a student's ability to make progress.

#### Sustainability through planning

The schools visited had all implemented successful programmes in terms of student achievement and exhibited the above factors in their schools to varying degrees. A combination of all the above appeared to lead to student, teacher and (in some cases) school change. Schools that had successfully made changes at all levels tended to be continuing with the programmes.

For programme sustainability at the classroom level there needs to be leadership support and in particular principal support. Support at this level can be provided by giving time for teacher reflection, analysis and lesson planning, along with time to meet with colleagues. Leaders who integrated their programme into the school-wide literacy or mathematics programme helped to ensure both success and sustainability. In these schools PfS was not seen as a separate programme but a way of raising achievement across the school.

From the visits it was clear that some schools were embedding programme and pedagogical approaches. In these schools, systems and resources were being aligned to support the maintenance of improvements in achievement and teacher practice through leadership, teacher capacity building and more reflective, collaborative teaching with close attention to student need.

# APPENDIX

## Assessment Tools

The following pages provide descriptions of the assessment tools used in the student achievement data analysis section.

### Mathematic Assessment Tools

#### *Progressive Assessment Test (PAT) Mathematics*

The PAT: Mathematics assessment indicates the level of achievement in the skill, knowledge and understanding of mathematics of students in Years 4 to 10. Each test includes questions organised according to five categories: number knowledge, number strategies, algebra, geometry and measurement and statistics.

The PAT: Mathematics norming data were collected in March 2008 and 2009.

#### *Global Strategy Stage (GloSS)*

The GloSS assessment consists of an interview between a teacher and their student. GloSS provides a global strategy stage across the operational domains of the Number Framework (addition/subtraction, multiplication/division, proportions/ratios). Progress through the stages indicates an expansion in knowledge and in the range of strategies students have available.

### Stages on the Number Framework

Stage 0: Emergent	The student is unable to consistently count a given number of objects because they lack knowledge of counting sequences and/or one-to-one correspondence.
Stage 1: One-to-one counting	The student is able to count a set of objects or form sets of objects but cannot solve problems that involve joining and separating sets.
Stage 2: Counting from one on materials	The student is able to count a set of objects or form sets of objects to solve simple addition and subtraction problems. The student solves problems by counting all the objects.
Stage 3: Counting from one by imaging	The student is able to visualise sets of objects to solve simple addition and subtraction problems. The student solves problems by counting all the objects.
Stage 4: Advanced counting	The student uses counting on or counting back to solve simple addition or subtraction tasks.
Stage 5: Early additive part-whole	The student uses a limited range of mental strategies to estimate answers and solve addition or subtraction problems. These strategies involve deriving the answer from known basic facts (e.g. doubles, fives, making tens).
Stage 6: Advanced additive/early multiplicative part-whole	The student can estimate answers and solve addition and subtraction tasks involving whole numbers mentally by choosing appropriately from a broad range of advanced mental strategies (for example place value positioning, rounding and compensating or reversibility). The student uses a combination of known facts and a limited range of mental strategies to derive answers to multiplication and division problems (e.g. doubling, rounding or reversibility).
Stage 7: Advanced multiplicative part-whole	The student is able to choose appropriately from a broad range of mental strategies to estimate answers and solve multiplication and division problems. These strategies involve partitioning one or more of the factors (for example place value partitioning, rounding and compensating, reversibility).
Stage 8: Advanced proportional part-whole	The student can estimate answers and solve problems involving the multiplication and division of fractions and decimals using mental strategies. These strategies involve recognising the effect of number size on the answer and converting decimals to fractions where appropriate. These students have strongly developed number sense and algebraic thinking.



## Literacy Assessment Tools

### *Observation Survey of early literacy achievement*

The Observation Survey assessment tool enables teachers to assess progress in beginning literacy. Student achievement in the Observation Survey is a measurement of text reading level and the stanine scores relating to the five test elements of the assessment (letter identification, word test, concepts about print, writing vocabulary, hearing and recording sounds in words).

### *Ready to Read Colour Wheel*

Ready to Read is the core instructional reading series for students in Years 1–3 working at curriculum levels 1 and 2. The texts offer multiple opportunities for learning, supporting students to become efficient readers. In particular, the series supports students to read, respond, and think critically.

A colour wheel is located on the back of each guided reading book, providing information about the suggested reading level. There are multiple levels within each colour (except Magenta) up to Gold, Level 22.



### *E-asTTle writing*

The e-asTTle writing assessment tool measures the writing ability of students in Years 1 to 10 against the New Zealand Curriculum. The e-asTTle writing norming data were collected in September 2010. Achievement norms are reported by a number of factors including year level, ethnicity and gender within the online e-asTTle portal itself. Cronbach's alpha for the e-asTTle writing assessment tool is .93 indicating a highly reliable assessment tool.