Overall Trends In Students' Achievement over the Transition and Beyond

In this chapter we report on overall student achievement in mathematics, reading and writing and look at group level trends only. A brief comparison of our students' asTTle results with data from a national sample of students within the same year levels is also included. Information on individual students and sub-groups of students is explored in subsequent chapters.

Point to note

- The following analyses are based on the asTTle results from students who completed mathematics (N=85), reading (N=87) and writing (N=77) assessments at each of the four phases of the study.

The international research suggests that students often experience a decrease in their academic achievement following the move to secondary school. In New Zealand, at the time the study was undertaken, there was little evidence of whether a drop in students' achievement early in Year 9 actually occurred, and, if it did, how long it took for their achievement to improve again as they settled in at secondary school. We were also interested in whether particular students were more adversely affected than others, in terms of their achievement, during, and after, the transition.

Overall trends in mathematics, reading and writing

Average student achievement in mathematics declined from Year 8 to Year 9 and plateaued in reading and writing.

Figure 1 provides details of the students' assessment scores in mathematics, reading and writing over the four phases of the study. The average student achievement results show that student performance from the last term of Year 8 (Phase 1) to the first term of Year 9 (Phase 2) plateaued in reading and writing, but in line with international research findings, declined in mathematics.

By the end of Year 9 average student achievement had improved markedly compared to earlier in the year.

Nevertheless, by the end of their first year at secondary school (Phase 3), there was a marked improvement in average student achievement in all three subject areas. The majority of students were now achieving either at or above the level achieved a year earlier in Year 8.

From Term 1 (Phase 2) to Term 4 (Phase 3) in Year 9, average student scores improved most markedly in mathematics: despite the considerable decline soon after the transition, they increased along similar lines to reading and writing when measured between Phases 1 and 3.

It is interesting to note that the pattern of average student performance in mathematics from the end of Year 9 to the beginning of Year 10 (Phase 3 to Phase 4) was a similar pattern to that for this subject a year earlier (between Phases 1 and 2), despite the fact that, this time, students had not had to change schools. Although we see a drop in average mathematics scores, it is not as great as a year earlier.

In addition, while there was again a levelling off in students' writing scores between Phases 3 and 4, by contrast, average reading scores continued to improve.

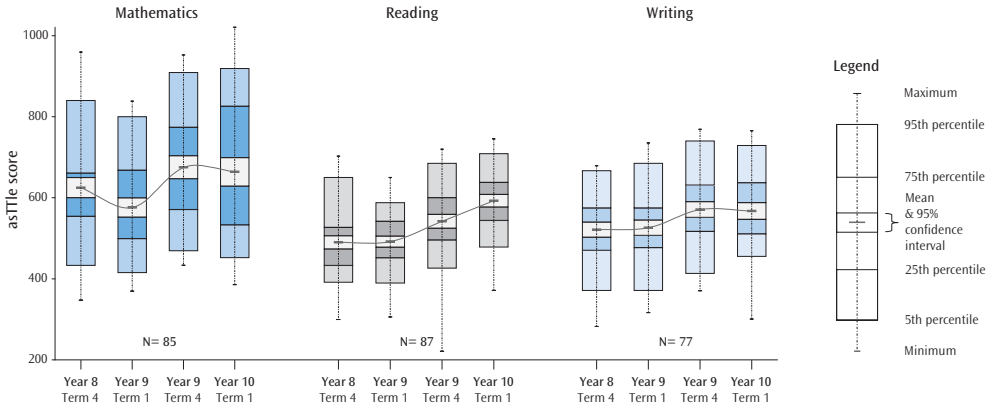
The 'box and whisker' plots in Figure 1 also show the spread of students' achievement scores in mathematics, reading and writing.

In mathematics, there was, broadly speaking, an overall trend for an increasing spread between high and low scoring students.

In contrast, the graph for reading indicates a reduction in the spread of scores from Phase 1 to Phase 2, and in particular a drop in the scores of students who achieved in the top quartile.

Finally, in writing there was a reduction in the spread of scores in Phase 4, and notably an improvement in the scores of students in the lowest quartile.

Figure 1: Students' achievement in mathematics, reading and writing



Explaining a drop in students' achievement over the summer holidays

Much is written in the international literature, especially from the USA, on the drop in students' achievement over the course of the summer break from school. Referred to as *summer learning loss*[14], (and sometimes within New Zealand as *holiday fade*) it varies across year level, subject, and family income and some research[15] suggests that students' achievement drops most in mathematics over this period. One line of reasoning for this drop is that mathematics is a subject usually restricted to learning at school whereas reading is more likely to be practised outside of school.

In saying that, *summer learning loss* is reported to have a greater effect on lower, rather than higher, socio-economic status (SES) student groups, particularly in the area of reading, which is thought to lead to a widening of the achievement gap between these two groups over time. Specific reading programmes have been designed in the USA and Australia[16] for example, to encourage families to read with children during the holidays to help reduce the occurrence of any loss in reading skills.

Our data show a noticeable drop in mathematics achievement following the summer holiday break, which also coincided with the transition to secondary school, and again following their move from Year 9 to Year 10 and a further summer break. It is difficult to know how much these lowered achievement levels can be attributed to *summer learning loss* or to *transition factors,* or to a combination of both. Our data would suggest, however, that the Year 8 to Year 9 transition, when students moved from primary to secondary schooling, had a far greater impact on students' learning than the move from Year 9 to Year 10.

A widening in the range of students' mathematics scores was evident at secondary school.

We also see a widening of scores between the highest and lowest achieving students in mathematics over the course of the study, which is consistent with some of the *summer learning loss* literature. In terms of reading achievement, we found that after the transition to secondary school there was an overall decline in the achievement of our students who were in the top quartile only, while the scores of other students plateaued over the same period, which is contrary to the research literature on *summer learning loss.*

Further research may be warranted to investigate in more depth what happens to students' achievement over the summer school holidays and, where possible, what impact, if any, factors such as changes in school setting may have on their achievement. For example, it would be interesting to compare the experiences of New Zealand students in composite schools (Years 1–15), who remain in the same school as they transition from primary to secondary schooling, with those of students who make the more common transition of physically moving from a primary or intermediate school to a secondary school at the end of Year 8.

14 http://en.wikipedia.org/wiki/Summer_learning_loss

15 Cooper et al (1996), cited Sharp, C. (2000).

16 *Summer Reading Campaign, No such Thing as a Vacation from Reading* (USA) and *Holiday Reading is Rad* (Australia). Refer NSW Department of Education and Training (2007).

While assessing students in mathematics, reading and writing provides an overall indication of how they are achieving in their schooling it does not provide a complete picture of students' strengths and weaknesses. Any further research may also want to consider looking at students' achievement in a far broader context over the transition and beyond.

Students' achieved curriculum levels

Another way to monitor students' progress was to track their achieved curriculum levels at each phase of the study. When assessing students' progress, asTTle not only provides details of the curriculum level at which a student is performing (i.e. Levels 2 to 6), it also breaks each curriculum level into three sub-levels to enable more fine-tuned analysis of students' progress. These sub-levels are categorised as *Basic*, *Proficient*, and *Advanced*.

As we have already seen in Figure 1, students' achievement scores in all three subjects covered a wide range, but especially so in mathematics.

Curriculum levels in mathematics

At the end of Year 8, students' mathematics scores ranged from 347 (Level 2 Basic) to 959 (Level 6 Basic), with a mean score of 625.

Table 3 shows that 45 percent of students were performing at Level 3 and a similar proportion – 42 percent – at Level 4. In general, our students' achievement was just slightly below where students nationally were performing at the same year level.[17]

Towards the end of Term 1 the following year, when they were in Year 9, students' mean mathematics score dropped by 49 points to 576. Fewer students (27%) were now achieving at Level 4 and a greater proportion (54%) were achieving at Level 3. At this time, there was also a considerable increase in those performing at Level 2 (from 7% in Phase 1 to 17% in Phase 2). Students' results in Phase 2 ranged widely from 369 (Level 2 basic) to 838 (Level 5 basic).

But average student achievement in mathematics increased by the end of Year 9 (Phase 3), with the mean score increasing by 99 points to 675. Student progression is evident in Table 3, where we see fewer students performing at Level 2 (6%) and Level 3 (39%) and greater proportions performing at Level 4 (35%) or Level 5 and above (20%). However, the range of scores was again very wide, from 433 (Level 2 proficient) to 952 (Level 6 basic).

By Phase 4 (early in Year 10) there was a further widening of the gap between the high and low achieving students, with scores ranging from 385 (Level 2 proficient) to 1021 (Level 6 advanced). While there was an increase in the number of students who were now achieving at Level 5 (21%) and Level 6 (5%), there was also an increase in those achieving at Level 3 and below (53% in Phase 4 compared with 45% in Phase 3). The mean score dropped 11 points to 664.

17 Project asTTle team (2006b).

Table 3: The curriculum levels students achieved in **mathematics** (N=85)

Curriculum level	Within level	Within level code	Phase 1 %	Phase 2 %	Phase 3 %	Phase 4 %
Level 6	Advanced	6A	–	–	–	1.2
	Proficient	6P	–	–	–	1.2
	Basic	6B	2.4	–	2.4	2.4
Level 5	Advanced	5A	–	–	4.7	4.7
	Proficient	5P	2.4	–	2.4	8.2
	Basic	5B	1.2	2.4	10.6	8.2
Level 4	Advanced	4A	7.1	8.2	8.2	7.1
	Proficient	4P	10.6	11.8	14.1	5.9
	Basic	4B	24.7	7.1	12.9	8.2
Level 3	Advanced	3A	21.2	5.9	18.8	9.4
	Proficient	3P	18.8	34.1	18.8	28.4
	Basic	3B	4.7	14.1	1.2	7.1
Level 2	Advanced	2A	1.2	8.2	4.7	3.5
	Proficient	2P	4.7	7.1	1.2	4.7
	Basic	2B	1.2	1.2	–	–
Below Level 2		<2B	–	–	–	–

Note: Due to rounding, percentages do not add to 100 percent.

Curriculum levels in reading

As shown in Table 4, half of our students in Phase 1 (end of Year 8) were performing at Level 2 of the curriculum or below, with a further third performing at Level 3. Fifteen percent of students were at Level 4. Students' scores ranged from 300 (below Level 2 basic) to 703 (Level 4 advanced), with a mean score of 490, which was below the national mean.

There was very little overall change in students' reading scores between Phase 1 and Phase 2, with marks achieved between 305 (below Level 2 basic) and 650 (Level 4 proficient). The mean score was 492. There was, however, slight movement in the number of students performing at the higher and lower curriculum levels attained. Fewer students were performing at Level 4 (11%) and Level 2 or below (47%) in Phase 2 compared with Phase 1 (15% and 51% respectively).

By the end of Year 9, average students' achievement in reading had improved, with a mean score of 542 (an increase of 50 points from Phase 2). A third of students were now working at Level 4 and above. Also, although there were still a small number of very low-performing students, the proportion of students performing at Level 2 or below showed noticeable improvement from the previous phase (19% compared with 47%). Scores were now recorded from 222[18] to 720.

Students' performance continued to improve in Phase 4 with well over half (60%) of students now achieving at Level 4 or above. Just six percent of students were still at Level 2. Students' scores ranged from 372 (Level 2 proficient) to 745 (Level 5 proficient). The mean score for Phase 4 was 593.

The national asTTle dataset found that students, on average, were performing within curriculum Level 3 on entry to secondary school.

[18] One student scored 222 for reading in Phase 3. Much of this student's assessment was difficult to read and consequently very little could be scored.

Table 4: The curriculum levels students achieved in **reading** (N=87)

Curriculum level	Within level	Within level code	Phase 1 %	Phase 2 %	Phase 3 %	Phase 4 %
Level 6	Advanced	6A	–	–	–	–
	Proficient	6P	–	–	–	–
	Basic	6B	–	–	–	–
Level 5	Advanced	5A	–	–	–	–
	Proficient	5P	–	–	–	3.4
	Basic	5B	–	–	2.3	5.7
Level 4	Advanced	4A	2.3	–	4.6	11.5
	Proficient	4P	5.7	3.4	11.5	11.5
	Basic	4B	6.9	8.0	14.9	27.6
Level 3	Advanced	3A	3.4	8.0	12.6	10.3
	Proficient	3P	8.0	13.8	8.0	12.6
	Basic	3B	23.0	19.5	26.4	11.5
Level 2	Advanced	2A	18.4	23.0	10.3	4.6
	Proficient	2P	28.7	21.8	8.0	1.0
	Basic	2B	2.3	1.1	–	–
Below Level 2		<2B	1.1	1.1	1.1	–

Note: Due to rounding, percentages do not add to 100 percent.

Curriculum levels in writing

In Phase 1, writing scores ranged from 283 (Level 2 basic) to 679 (Level 4 proficient), with a mean of 521. Just over half of students at the end of Year 8 were performing at Level 3.

Table 5 shows there was little change in curriculum levels from Phase 1 to Phase 2, with a similar proportion of students still working at Level 3 (55%), and the mean score of students remaining similar at 526. Scores ranged from 317 to 735.

National asTTle data highlight students' writing ability as an issue of concern.

By the end of Year 9, students were performing at higher levels in writing than they were earlier in the year and their scores ranged from 371 (Level 2 proficient) to 769 (Level 5 basic), with a mean of 570. A greater proportion of students were now achieving at Level 4 and above (30% compared with 16% in Phase 2) and fewer students were at Level 2 (12% compared with 30% in Phase 2).

Overall, students' scores for writing in Phase 4 remained fairly similar to the previous phase, ranging from 301 (Level 2 basic) to 765 (Level 5 basic), with a mean of 567. There was an increase in the proportion of students performing at Level 3 (64%), contributed to by a drop in the number of students achieving at the higher and lower curriculum levels (i.e. Level 4 and above, and Level 2).

These writing results are supported by national data which highlight writing as an issue of concern for a large number of New Zealand secondary students. Analyses of the national asTTle dataset indicate that the writing ability of a large number of secondary school students did not improve beyond curriculum Level 3 while at secondary school and that almost half of secondary students had the same distribution of writing scores as many primary school students.[19]

[19] Project asTTle team (2006a).

Table 5: The curriculum levels students achieved in **writing** (N=77)

Curriculum level	Within level	Within level code	Phase 1 %	Phase 2 %	Phase 3 %	Phase 4 %
Level 6	Advanced	6A	–	–	–	–
	Proficient	6P	–	–	–	–
	Basic	6B	–	–	–	–
Level 5	Advanced	5A	–	–	–	–
	Proficient	5P	–	–	–	–
	Basic	5B	–	–	3.9	2.6
Level 4	Advanced	4A	–	1.3	5.2	10.4
	Proficient	4P	6.5	7.8	7.8	5.2
	Basic	4B	7.8	6.5	13.0	7.8
Level 3	Advanced	3A	13.0	10.4	7.8	13.0
	Proficient	3P	20.8	22.1	35.1	27.3
	Basic	3B	20.8	22.1	15.6	23.4
Level 2	Advanced	2A	18.2	18.2	5.2	6.5
	Proficient	2P	9.1	9.1	6.5	1.3
	Basic	2B	3.9	2.6	–	2.6
Below Level 2		<2B	–	–	–	–

Note: Due to rounding, percentages do not add to 100 percent.

Comparison of students' achievement scores with the national asTTle dataset

The collection of national asTTle data by the asTTle project team[20] involved a representative sample of around 100,000 students nationally. Students in Years 5 to 12 were assessed in reading, writing, mathematics, pānui, tuhituhi and pāngarau.[21] National achievement data for each of these subjects were collected at different times between November 2000 and March 2004. The scores, however, have been calibrated to end of year results in each of the assessment areas which meant that we were only able to compare Phase 1 and Phase 3 data from our study with the national results.

As can be seen in Figure 2, generally, students in our study seemed to progress at much the same rate as the students in the national asTTle dataset in mathematics and writing, although there was a wider spread of scores evident for writing in the national sample at both Year 8 and Year 9. In writing, students' scores were similar to the national mean, while in mathematics they were slightly below the national mean.

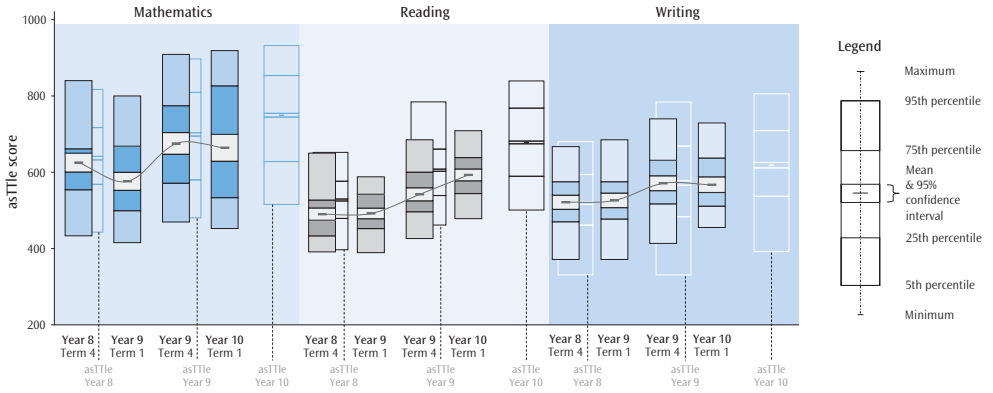
While our students improved well in reading once at secondary school their average achievement scores were well below the national mean at the end of Year 9.

Students in our study seemed to progress at much the same rate as the students in the national asTTle dataset in mathematics and writing.

20 See website for further details: www.asttle.org.nz

21 Students in Māori-medium schools were assessed in pānui (reading), tuhituhi (writing) and pāngarau (mathematics).

Figure 2: Comparison of students' achievement in mathematics, reading and writing with the national asTTle dataset from Years 8, 9 and 10



Note: The plain bars on this figure represent the national asTTle dataset. We were unable to directly compare our Year 10 data with the national data for Year 10 as the information was not collected at comparable times. However, the Year 10 information provides an indication of how we might expect our students to have performed had we re-visited them at the end of Year 10.

As well as comparing our students with students across 'all schools' in the national asTTle dataset, asTTle also enables comparisons to be made with students from 'like schools'.[22]

When we compared our students with the national data for students in deciles 2 and 3 schools we found that our students were, again, achieving below the national sample's mean in reading.

And, whereas in Phase 1 our students were achieving well above the mean in mathematics compared with the 'like schools' national dataset, by Phase 3 they were achieving well below the mean. In writing, however, students were well above the mean for 'like schools' in Phase 3 and around the national mean in Phase 1.

Table 6 compares the effect size differences between our students' Phase 1 and 3 scores in mathematics, reading and writing and the national asTTle dataset for Year 8 and Year 9.[23] These data show that our students progressed at much the same rate in mathematics as the national sample, and at a slightly better rate in writing.

In reading, however, the students in our study progressed at a much lower rate than the national sample between Year 8 and Year 9 (Phases 1 and 3). This may in part be due to the nature of our sample – that is, our over-sampling of Pasifika students.[24] Results from PISA 2006 (Ministry of Education, 2007b) found that Pasifika students scored significantly below the mean performance of Pakeha–European and Asian students and the OECD mean on the combined reading literacy scale.

22 In asTTle, information can be clustered by 'all schools' or 'schools like mine'.

23 The national asTTle data have been calibrated to end of year results in each of the assessment areas, which means we are able to compare the results from Phases 1 and 3 of our study with the national results for Years 8 and 9 only.

24 Twenty-seven percent of participating students identified as Pasifika.

Table 6: Effect size differences between our Phase 1 and Phase 3 scores in mathematics, reading and writing and the national asTTle dataset

AsTTle scores for…	Effect size differences		
	Mathematics	Reading	Writing
Transition Study students in Phases 1 and 3	0.40	0.66	0.58
Years 8 and 9 students in the national asTTle dataset	0.48	0.86	0.43

Summary of overall trends in students' achievement

In line with international research, our results show that average student achievement in mathematics declined between the end of Year 8 and early in Year 9. Students' achievement in reading and writing plateaued over the same period.

When students were assessed again at the end of Year 9, average student achievement had improved markedly in mathematics, reading and writing compared to earlier in the year. There was a second drop in students' achievement in mathematics, however, as they moved from Year 9 to Year 10, despite the fact that this time, students had not changed schools.

Generally, students in our study progressed at much the same rate in mathematics and writing as the students in the national asTTle dataset but at a much lower rate in reading.