MINISTRY OF EDUCATION
TE TĀHUHU O TE MĀTAURANGA

Achievement and progress in mathematics, reading and writing in primary schooling

Analysis of e-asTTle assessment data, 2011 to 2016

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Mātauranga House, 33 Bowen Street
PO Box 1666, Thorndon
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Contents

Foreword

In order to support student learning it is important to continually improve our understanding of student achievement and progress. This project makes use of existing data to contribute to our current knowledge of student achievement and progress.

Throughout the school year teachers regularly assess the progress of students. As the New Zealand Curriculum states: the primary purpose of assessment is to improve students' learning and teachers' teaching[1]. For this purpose, teachers gather a variety of information that provides evidence of their students' progress.

Most assessment that takes place is informal, but sometimes teachers make use of formal assessment tools. These formal assessment tools ensure consistency in the interpretation of both progress and achievement by students and teachers. Schools have access to a range of formal assessment tools.

This project used data gathered through the use of the e-asTTle assessment tool to add to our evidence base regarding student achievement and progress in mathematics, reading and writing.

[1] The New Zealand Curriculum, the Ministry of Education, 2007.

Overview of e-asTTle and the dataset

The Assessment Tools for Teaching and Learning (asTTle) is an online assessment tool, developed to assess students' achievement and progress in reading, mathematics, writing, and in pānui, pāngarau and tuhituhi. The main purpose of e-asTTle is to support teachers in their teaching.

The e-asTTle software was first developed by Auckland UniServices in 2000 as a CD-ROM package that enabled teachers to create and analyse literacy and numeracy tests for curriculum levels 2–6. Since then, improved versions have been developed and launched. E-asTTle is the current, on-line version of this tool.

In e-asTTle testing, the difficulty of the test is taken into account so that student performance can be compared on a consistent scale. Students of all year levels are measured against the same scale and therefore achievement information can be compared across year levels or across calendar years.

Note that not all schools use e-asTTle and not all students within a school are tested with the tool. Also, during a school year students may be tested more than once.

The assessment also provides information about a student's level of achievement, relative to the curriculum levels, as described by the New Zealand Curriculum and relative to the average achievement of the New Zealand student population (also called 'population norms'). The tool collates demographic information of the students as well as information on the characteristics of the schools.

The development stage of asTTle generated, as a one off product of the trial, nationally representative statistics on student achievement for 2000 -2004. These statistics were published by the Research Division of the Ministry of Education in 2006 as part of an information kit for the education sector that brought together the findings from a range of studies on student achievement[2].

The e-asTTle tool was recalibrated in 2010 for mathematics and reading and in 2012 for writing. The purpose of a recalibration is to account for the possibility that the psychometric properties of e-asTTle items might have changed over time, including updating the population norms, so results are compared to the current national distribution of achievement.

This project used English medium data from tests undertaken from 2011 onwards for mathematics and reading and from 2012 onwards for writing. The data comes from schools that have given consent for the data generated by their schools to be used for research purposes[3].

When consent is given, there is a guarantee that identifying information about students' identity and school will be removed to prevent identification of individuals and schools

[2] Student Achievement in New Zealand, Ministry of Education, 2006.

[3] 97% of schools that use e-asTTle have given consent for the data to be used for research.

Project objectives

This is the first comprehensive study by the Ministry on the use of the e-asTTle tool for research purposes. Since the main purpose of the tool is to support teachers in their teaching, it is important to understand the strengths and limitations of the tool for research purposes. Therefore, the first objective of this project was to assess the potential of the e-asTTle dataset as a source of progress and achievement data for research purposes. This step involved:

- setting up robust data management processes; and
- building business rules and guidance on the use of the data.

The second objective was to report on initial findings from the data as a way of illustrating its potential. The analysis was mainly descriptive and was informed by the following overarching research questions:

- How well do students perform in mathematics, reading and writing, and how does this compare to other findings?
- What is the pattern of student achievement/progress over time? How does this pattern relate to the expectations outlined in the New Zealand Curriculum?
- To what extent does student performance differ when analysed by student and school characteristics?

Note that to fully understand how the different characteristics of students or their schools are related to student achievement, techniques that are able to control for the interaction between the different characteristics need to be used. This section does not attempt to do that; it does not study causality or try to establish which student or school characteristics explain high or low performance.

Key Findings

The e-asTTle dataset and its use for research

- Data generated by e-asTTle as part of the assessment process in schools, provides a rich dataset that can be used for research into the achievement and progress in mathematics, reading and writing for Years 1 to 10.
- The assessment tool is not used evenly across different types of schools and it is used for different purposes throughout the year. This means that subsets of the full data need to be selected purposefully to be able to answer specific research questions. In addition, adjustments for bias in the data may need to be considered when computing national estimates of achievement or progress.
- The analysis shown in this report has only used data from tests undertaken in November and December for mathematics and reading and from mid-October to December for writing. This end-of-year sample allows for computing achievement measures that can be better compared with the expectations described in the New Zealand Curriculum and to therefore understand year on year progress.
- Data for years 9 and 10 students has been weighted by school decile to adjust for an over representation of students from lower decile schools observed in the dataset.

Achievement and progress in mathematics, reading and writing from 2011 to 2016

- The majority of students at the end of Year 4 are achieving within level 2 of the curriculum or above for mathematics, reading and writing, which reflects the expectation of the New Zealand curriculum.
- At least a third of students at the end of their primary education (end of Year 8) are achieving scores in writing and mathematics within curriculum levels that are lower than the level expected by the New Zealand Curriculum. The proportion of students not meeting the expectations of the curriculum is largest for writing and smallest for reading.
- Results relating to achievement against curriculum expectations are broadly consistent with results from the National Monitoring Study of Student Achievement for all three learning areas.
- As expected, students' levels of achievement in all the three learning areas improve as students move through the years of schooling. The rate of achievement, or *progress*, declines on average as students move up the years of schooling, though students make better progress in writing throughout primary school compared to mathematics and reading. Yearly progress in writing is close to expected levels for all years except Year 9.
- The transition from Year 8 to Year 9 is associated with the lowest mean annual progress for all three learning areas. And furthermore, outside of this Year 8 to

Year 9 (Primary to Secondary) transition period, average achievement is relatively lower in all learning areas for students who had changed schools since the previous year compared to those who had not.

- There is a wide variation in the yearly progress made by students in the same year level for the three learning areas. While some students show no increase in their end-of-year achievement scores after one year of schooling, some students progress in one year more than one curriculum level which is typically expected to take two years.
- Overall achievement scores in mathematics, reading and writing differ widely for students at the same year level. The variation is greatest for writing. At the end of Year 8 while a considerable number of students are achieving within level 5 of the curriculum (above expectation), others are achieving within level 3, and in writing within level 2.
- Difference in average achievement can also be seen when the data is analysed by school decile, ethnicity and gender. These observed differences are consistent with evidence from international studies and other national achievement data.
- Unlike achievement, there is no clear relationship between annual progress in the three different learning areas and school decile, gender or ethnicity. Therefore, the differences in achievement by school decile, gender and ethnicity observed at higher levels of primary school reflect different starting points rather than differing progress throughout Years 4 to 8.

The e-asTTle dataset since the 2010 re-calibration: Is the data useful for research?

Summary

e-asTTle is used by a large number of schools to assess a large number of students from Years 1 to 10 for mathematics, reading and writing. It provides a robust and rich source of achievement data that can be analysed to add to the current evidence base regarding achievement and progress in mathematics, reading and writing.

When designing data extracts for analysis one needs to take into account that:

- the population of students tested with e-asTTle is not a random sample of the New Zealand population of students
- teachers use e-asTTle throughout the schooling year for different purposes and design the tests to fit that purpose.

The summative achievement analysis shown in this report has only used data from tests undertaken at the end of the schooling year. End of year samples allow for computing achievement measures that can be better compared with the expectations described in the New Zealand Curriculum and to understand year on year progress.

All subgroups of schools and students are adequately represented in the data. However, at secondary level, students in higher decile schools are under-represented in the dataset. Therefore, to arrive at meaningful estimates of overall achievement for Year 9 and Year 10 students, the data in this report has been weighted to correct the decile bias.

A subsample was derived for estimates of student annual progress. This included students for whom we can find two tests from which to derive the annual change in achievement. The estimates of progress have not been weighted.

This section describes the data in the e-asTTle dataset for context in which to understand its potential and to interpret the results.

Data cleaning process

The e-asTTle database contains all tests generated by schools. Some of these tests are not valid for research and therefore need to be excluded. The three main criteria to exclude a test are:

- tests that are identified as being trial tests

- tests with blank scores
- tests for which the curriculum level of the score achieved is two or more curriculum levels above or below the difficulty level that the test has been set at.

In addition, students appearing multiple times in the database but for whom the year level information was not consistent were deleted as there was no reliable way to correct the year level information.

For the 2016 school year, after the cleaning process, 92% of mathematics tests, 97% of reading tests and 100% of writing tests included in the database were included in the research dataset.

The size of the clean database

Table 1 shows the total number of tests per learning area in the years after the latest re-calibration available for research.

Table 1 Total number of tests available in the e-asTTle research dataset

Learning area	2011	2012	2013	2014	2015	2016
Mathematics	315,763	379,078	400,993	392,389	389,794	416,484
Reading	319,428	382,320	400,874	397,486	391,124	415,679
Writing (*)	N/A	232,860	417,827	434,168	414,622	422,281

(*) The new e-asTTle writing tool was not available to schools until mid 2012.

Not all schools use e-asTTle and not all students within a school are tested with the tool. Also, during a school year some students are tested more than once using e-asTTle. Therefore, the number of tests in a schooling year does not represent the number of students.

Table 2 shows the number and proportion of schools that have used the e-asTTle tool since the latest re-calibration. In 2016, e-asTTle was used by 38% of all New Zealand schools for mathematics, 45% for reading and 47% for writing.

Table 2 The number of schools that have used e-asTTle since 2011

Year	Mathematics		Reading		Writing	
	N	*% of all schools*	*N*	*% of all schools*	*N*	*% of all schools*
2011	800	31%	935	36%		
2012	930	36%	1,097	43%	958	38%
2013	962	38%	1,167	46%	1,123	44%
2014	970	38%	1,157	46%	1,194	47%
2015	964	38%	1,173	46%	1,180	46%
2016	957	38%	1,149	45%	1,199	47%

Table 3 shows the number and proportion of students that have been tested at least once during the school year since 2011. The e-asTTle tool is infrequently used for students younger than Year 4 or older than Year 10 for mathematics and reading because it is designed to assess students against curriculum levels 2 to 6 for these learning areas. The writing tool can be used from entry level but it is not used as much once students are in secondary education. Therefore, the numbers of students have been restricted to Years 4-10 for mathematics and reading and Years 1- 10 for writing. In 2016, of all New Zealand students from years 4 to 10, 36% were tested at least once with e-asTTle in mathematics and 46% in reading and 36% of all students from Years 1 to 10 in writing.

Table 3 The number of students that have been tested at least once since 2011

Year	Mathematics Years 4 -10		Reading Years 4-10		Writing Years 1-10	
	N	*% of students*	*N*	*% of students*	*N*	*% of students*
2011	121,725	29%	159,774	38%	N/A	N/A
2012	140,788	34%	185,328	44%	151,409	26%
2013	149,188	36%	194,402	47%	2157,85	36%
2014	148,956	36%	191,581	46%	22186,1	37%
2015	149,893	36%	192,630	46%	220,975	36%
2016	154,520	36%	197,032	46%	222,816	36%

The use of the tool is varied between schools in terms of the three learning areas, time of the year and proportion of students tested within the school. Nevertheless, the tables show that the use of e-asTTle is widespread and the database holds a large amount of data.

The demographic information

Student information such as gender and ethnicity is imported into e-asTTle from the school's Student Management System (SMS).

Ethnicity is derived from the primary and secondary ethnicity values imported from the SMS. We use *prioritised ethnicity* with the ordering being Māori, Pasifika, NZ European, and Other. Asian students are included in the 'Other' category and therefore cannot be reported on separately.

The use of the tool by different types of schools

The use of e-asTTle differs by type of school. Table 4 shows the distribution of the use of the tool across different types of school for 2016.

Table 4 The number and proportion of schools using e-asTTle by type of school

School Type	Mathematics		Reading		Writing		Total by type
	N	%	N	%	N	%	
Contributing (Year 1-6)	240	31%	317	41%	404	53%	766
Full Primary (Year 1-8)	369	35%	426	40%	528	49%	1,067
Intermediate (Year 7-8)	72	62%	90	77%	80	68%	117
Composite (Year 1-13, 7-10)	66	39%	77	45%	66	39%	170
Secondary (Year 7-13)	68	63%	79	73%	61	56%	108
Secondary (Year 9-13)	142	60%	160	68%	60	25%	236
Total	**957**		**1,149**		**1,199**		**2,527**

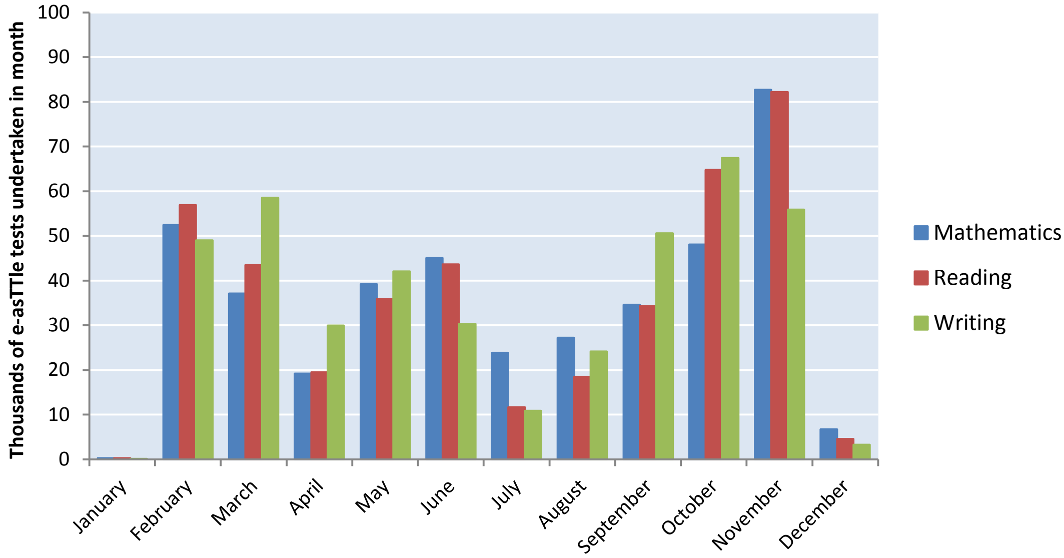
e-asTTle is used by a higher percentage of intermediate and secondary schools than primary and composite schools for mathematics and reading. For example, 60% to 63% of secondary and intermediate schools use e-asTTle for testing mathematics compared to 31% to 39% of composite and primary schools. Between 68% and 77% of intermediate and secondary schools use e-asTTle for reading compared to 40% to 45% of primary and composite schools.

The writing tool is less likely to be used by secondary schools than the mathematics and reading tool (25% of secondary schools covering Year 9-15) and it is used by a higher percentage of intermediate schools (68%) than full primary schools (49%). This means that when doing analysis of writing tests for the intermediate year levels (Year 7 and 8), the data available will have a higher representation of intermediate schools compared to full primary.

The use of the tool for assessment throughout the year of schooling

The e-asTTle tool is not used uniformly during the school year. This can be seen from Figure 1, below, which shows the number of tests that were undertaken using e-asTTle in each month of 2016.

Figure 1 Number of e-asTTle tests undertaken in 2016, by month



As we can see from Figure 1, more students are assessed at the beginning and the end of the year. This is likely to represent two different purposes for testing. At the beginning of the school year, teachers will be using the tool to generate baseline data for formative purposes. November is the month when most tests are undertaken for mathematics and reading. This is the time of the year that teachers are gathering evidence to report achievement. The story is slightly different for writing, where the most prevalent times for testing are March and October. Writing tests are more complex to carry out. While in mathematics and reading the tests are marked automatically by the tool, in writing teachers are required to mark the tests themselves and input the results in the tool.

It is important to note that the same student may be tested more than once during the year and so the number of tests does not represent the number of students.

Defining the analytical dataset

In this section we introduce the sample of students that we use for most of the analysis in this report. We will refer to this as the *end-of-year dataset*.

Year levels selected

We focus our analysis on tests from students from Years 4 to 10 for mathematics and reading, and for Years 1 to 10 for writing. These are the years for which the tool has been designed and for where there is significant data coverage, enabling meaningful conclusions.

Only end-of-year tests

In order to enable the measurement of year-on-year progress, we restrict our sample to tests undertaken as part of the end-of-year reporting. There are three reasons for this:

- Teachers at the end of the year are more likely to be testing to understand the overall level of performance of their students (rather than for purely formative reasons). Tests at the end of the year are more likely to be purposely designed to measure overall achievement in a learning area;
- Year-on-year comparisons can be made;
- Because of this, our analytical dataset is made up only of tests that were generated from 1 November onwards for mathematics and reading. As can be seen in Figure 1, the data suggests that end of the year testing for writing starts a bit earlier. For this reason, writing tests from October 15 onwards were used.

Only one test per student

Even in the short period from which tests were selected, there are students who were tested more than once in the same learning area. Situations when this occurs are:

- Teachers who assess the whole learning area by organising two tests that measure different strands of the same learning area;
- Students changing schools and being tested in both schools;
- Students at Year 6 or Year 8 being tested in the school they are at and also at the school they may go to next year.

In all cases where more than one test exists for the same student, one unique overall score has been selected or computed so there is only one observation per student. When more than one test existed from the same school an average score was computed. If the tests were generated by two different schools the score generated in the first school was chosen.

Amount of data in the end-of-year dataset

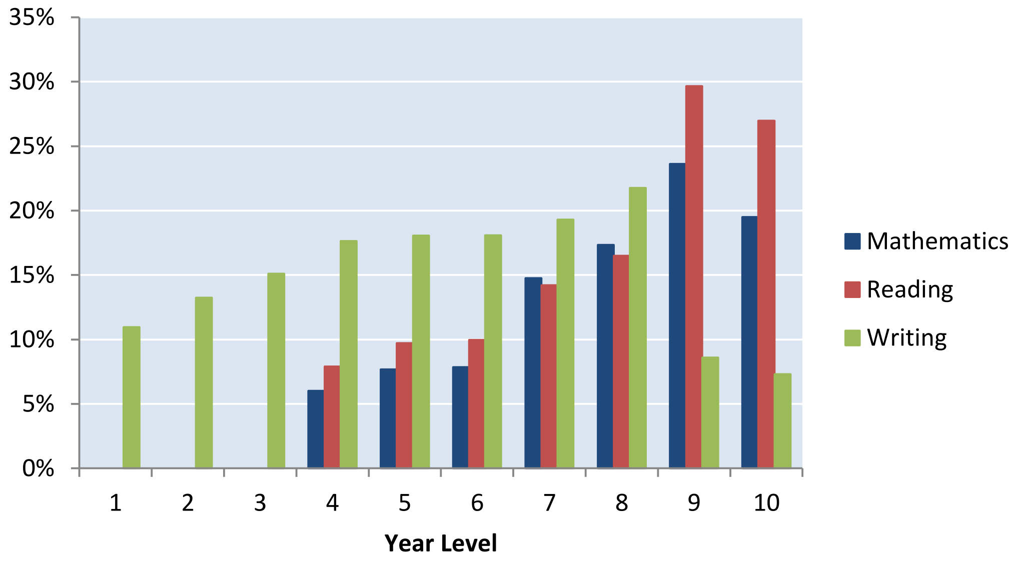
Table 5 shows the number and proportions of New Zealand students assessed at the end of the year using the e-asTTle tool for mathematics, reading and writing since 2011. These show the size of the sample of students on which the main analysis of student achievement is based. The proportions refer to the proportion of students at each year level compared with the New Zealand population of students for the relevant year. Figure 2 presents this information in a visual format. The distribution of student numbers across years is shown in the Appendix.

These patterns of e-asTTle use by schools do not necessarily reflect the general assessment practices of schools as e-asTTle is only one tool that schools may use when assessing students.

Table 5 The number and proportion of students in the end-of-year research dataset, by year level and learning area

Year level	Mathematics		Reading		Writing	
	N	*%*	*N*	*%*	*N*	*%*
1					33,529	11%
2					40,393	13%
3					45,076	15%
4	21,006	6%	27,776	8%	51,876	18%
5	26,341	8%	33,282	10%	51,974	18%
6	26,653	8%	33,794	10%	51,154	18%
7	59,129	15%	56,404	14%	63,260	19%
8	60,697	17%	57,308	17%	62,908	22%
9	81,334	24%	10,2749	30%	24,625	9%
10	67,640	19%	94,464	27%	21,264	7%

Figure 2 The percentage of students in a year level included in the analysis of student achievement, by year level and learning area



A higher proportion of secondary students are assessed at the end of the year with e-asTTle in mathematics and reading compared with primary students. For writing, e-asTTle is mostly used for primary level students. Year 7 and 8 students are more likely to be assessed with e-asTTle than the younger years of primary across the three learning areas.

Representativeness of the end-of-year e-asTTle data

The representation of the ethnic groups in our sample is very close to the total population. In the e-asTTle sample used in this analysis, 22 percent of the students are of Māori ethnicity and 12 percent of Pasifika ethnicity. In 2016, 23 percent of the students learning in English medium were Māori and 10 percent Pasifika.

The proportions of girls and boys in the sample data is close to 50% in all learning areas and year levels, as it is in the overall population.

Primary-level students from the ten different school deciles are represented in similar proportions in the dataset and therefore achievement estimates are not particularly affected by a school decile bias. However, at secondary level, students from lower decile schools are more likely to be represented in the data, especially in writing. The percentages of students in the different decile groups are shown in the Appendix.

To account for this bias in the data, the data in this report for Years 9 and 10 have been weighted by school decile when deriving achievement estimates. If not weighted, because of the lower average performance of lower decile students, the achievement estimates would underestimate overall achievement for these years.

For writing, the e-asTTle tool is used by few schools in secondary and by a very small minority of secondary high decile schools. The weighting process was done by grouping decile 9 and 10 students together into one decile group so there was enough data to compute achievement estimates.

Selecting data to analyse student progress

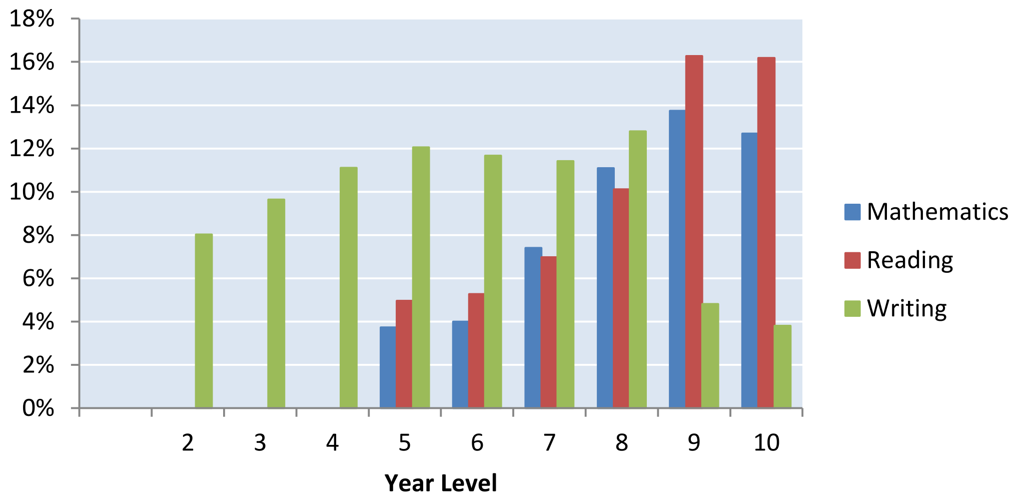
As mentioned above, the database is not comprised of all students in New Zealand. Even for those schools that use e-asTTle, the use may not be universal for all year levels at a school, or for all students within a year level. Also, students come and go from schools; they may move from one school that uses e-asTTle to another that does not. Therefore, some of the students that appear in the dataset may appear only once while others may appear two or more times at different year levels. By analysing the data for those students for whom we have more than one test in the database, we are able to study student progression.

In this report we relate estimates of student annual progress to expected progress through the curriculum levels. We show student progress in achievement (or achievement gain) from the end of one school year to the end of the following school year. Because we require at least two sets of results, the sub-sample for the analysis of student progress is smaller than that used to analyse student achievement. Table 6 and Figure 3 show the size of the sample of students who are included in the analysis of student progress from the end of one school year to the next school year.

Table 6 The number of students tested at consecutive year-ends, by year level

Year level	Mathematics *N*	Reading *N*	Writing *N*
2			
3			
4			
5	10,914	14,513	28,374
6	11,429	15,087	26,780
7	24,774	23,337	30,458
8	32,679	29,799	29,992
9	40,037	47,413	11,235
10	37,451	47,755	8,961

Figure 3 The percentage of students in a year level included in analysis of student progress (from the end of one year to the next)



Overall student achievement and progress from 2011 to 2016

In this section, we present the end of year achievement results for Years 4 to 10 in mathematics and reading, and writing. In the interests of full disclosure and to further motivate our choice to truncate the data to Years 4 to 10, we show the full data plot as well.

We also report on the achievement gain that students make from the end of one year of schooling to the end of the following year. We call this measure *annual progress* and it has been calculated for those students in the database for whom we find achievement scores for two consecutive schooling years (see Table 6).

Achievement and progress results are compared with the expectations of the New Zealand Curriculum in mathematics, reading and writing.

New Zealand Curriculum achievement and progress expectation for all subjects by year level

The New Zealand Curriculum shows how curriculum levels typically relate to years at school. Figure 4 shows the relationship between curriculum levels and years of schooling as shown in the curriculum document footnote.

Figure 4 School Years and Curriculum Levels

One of the strengths of the e-asTTle tool is that it is aligned to the New Zealand Curriculum. e-asTTle allows achievement scores to be interpreted in terms of curriculum level. e-asTTle uses a Rasch model to assign difficulty values, in order to test questions and equivalent ability levels to students. Once the questions have assigned difficulty values, a sample of questions is taken and placed in difficulty order. A panel of experts decided the cut-off points for each curriculum level.

In this report achievement is always shown against curriculum levels which in turn can be interpreted against the end of year expectations stated by the New Zealand Curriculum.

From school entry to Year 10 the New Zealand Curriculum indicates an expectation of progress in which one curriculum level equates to two years of schooling. In other words, to fulfil the expectation of the New Zealand Curriculum, students on average should progress at least half a curriculum level per year until Year 10. Note that this is not entirely linear with the e-asTTle score bands differing slightly in width at each curriculum level, and we will therefore see artefacts of this in our progress and achievement statistics.

The e-asTTle curriculum level ranges for mathematics, reading and writing vary in width on the e-asTTle scale. This was due to calibration in which over 17,000 test scripts along with teacher consultation was used to align test scores with curriculum levels.

For mathematics and reading the average width of curriculum levels 2 to 5 measured in e-asTTle points is 100 points. For writing, it is 116 e-asTTle points. Therefore, the average year progress necessary to progress through the New Zealand Curriculum as expected can be estimated as 50 e-asTTle points for mathematics and reading, and 58 points for writing.

In this report the estimates of annual progress are always shown against these benchmarks of expected average yearly progress (50 e-asTTle points for mathematics and reading, and 58 points for writing).

The next sections describe progress and achievement across mathematics, reading and writing. A standard colour scheme is used in graphs to distinguish the three different learning areas:

Progress and achievement in Mathematics

Summary

Mathematics achievement and annual progress is consistent from 2011 to 2016.

Mean mathematics achievement for students at Years 4 to 6 align with the expectations set by the New Zealand Curriculum but for later years the average achievement is lower than the level expected by the New Zealand Curriculum.

Mean annual progress decreases as students move from Year 4 to Year 10. The transition from primary or intermediate to secondary school is associated with the lowest mean annual progress.

At each year at primary level there is a considerable proportion of students who are achieving at curriculum levels higher than the curriculum expectation. However, there is a large spread of achievement at each year level. There is also a wide variation in the amount of measured progress students make over a school year, with some students progressing a whole curriculum level while others show no progress.

The data shows that in mathematics, close to a third of students at the end of Year 8 are achieving scores lower than the level expected by the New Zealand Curriculum. This proportion increases to 44% at the end of Year 10.

The results from this study on achievement in mathematics against curriculum expectations are broadly consistent with results from the National Monitoring Study of Student Achievement.

Annual achievement and progress in mathematics by Year level

The patterns of mathematics achievement and annual progress of New Zealand students from 2011 to 2016 have been very stable.

Figure 5 shows the distribution of achievement for each year level at the end of the school year from 2011 to 2016. The distribution of achievement is shown as box-plots against the curriculum level bands so achievement can be interpreted against expectations. Mean achievement at each year level is also shown.

Figure 5 Distribution of mathematics achievement at the end of the schooling year mapped to curriculum level (CL), from 2011 to 2016

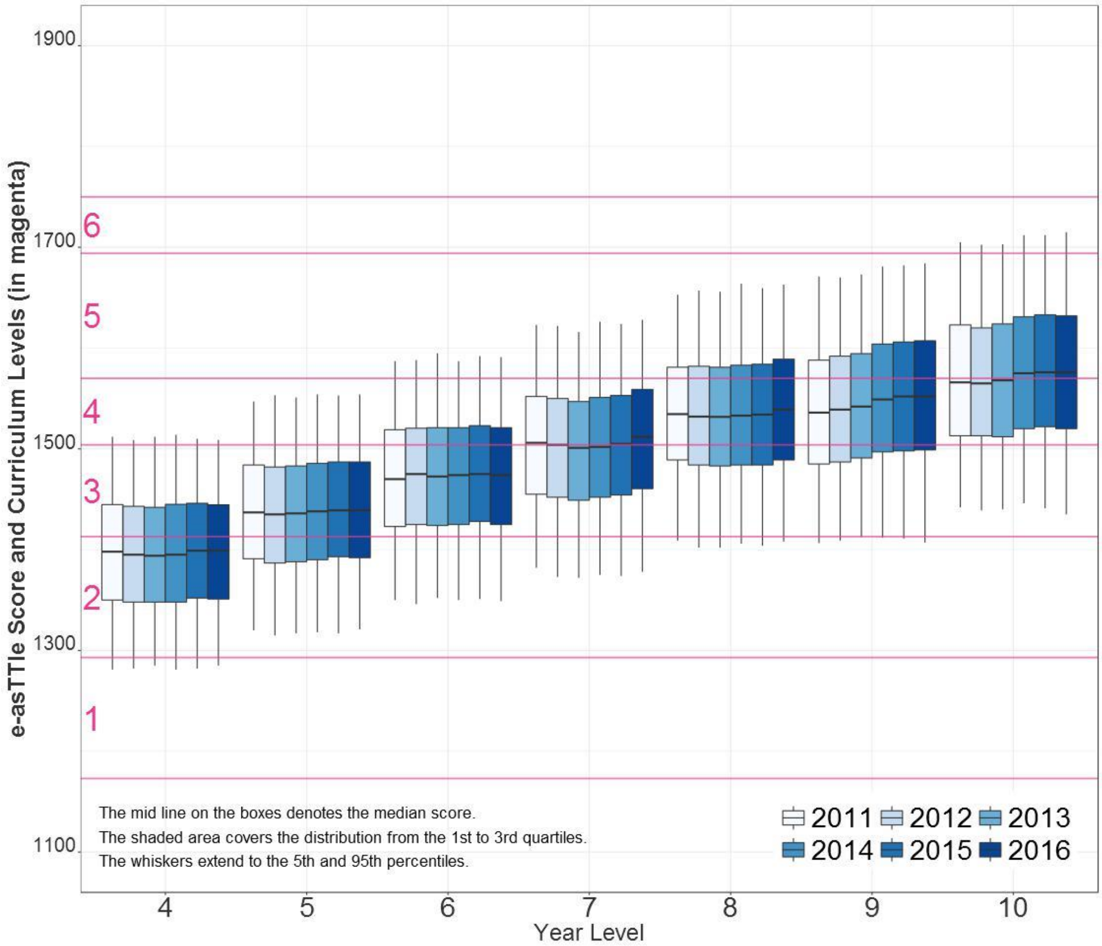
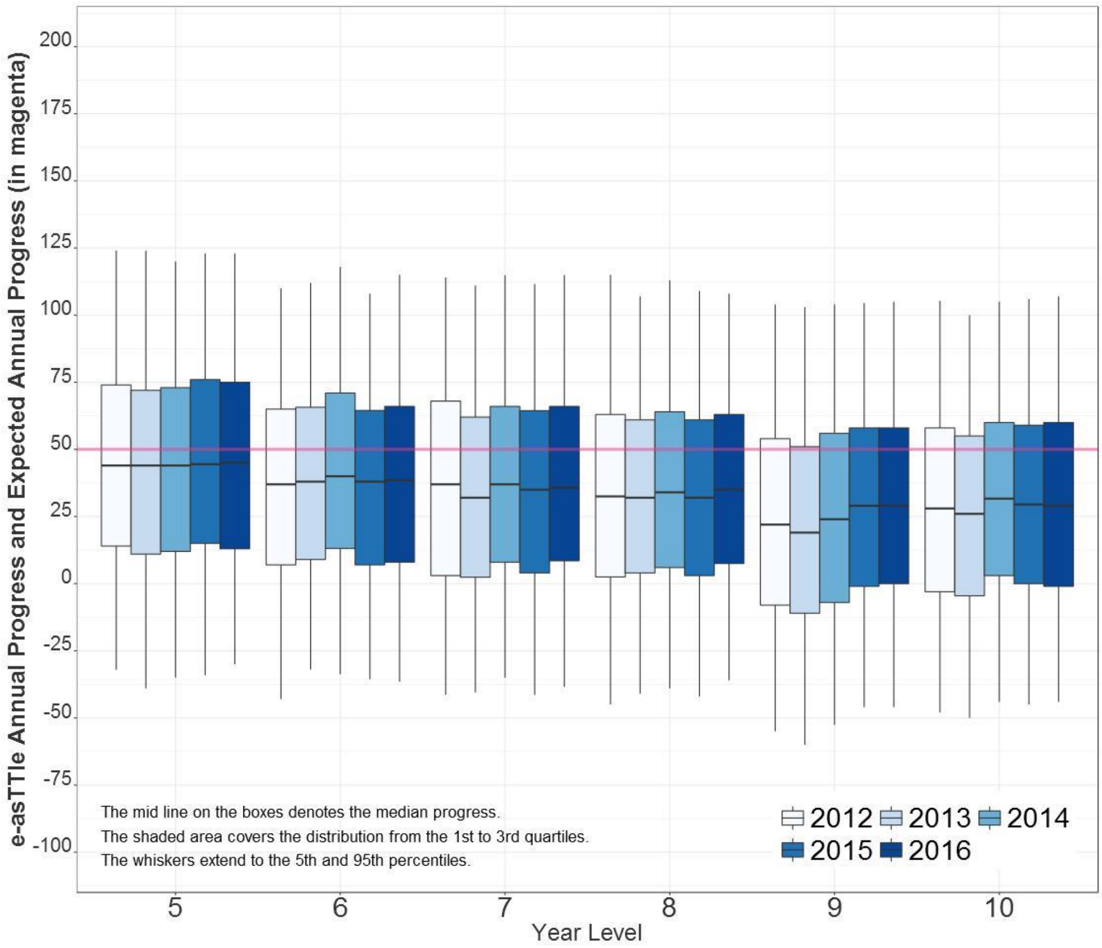


Figure 6 shows the distribution of annual progress from the end of one year of schooling to the end of the consecutive year. It shows that there is a very slight downward trend in progress in mathematics against the curriculum. This is most pronounced in Year 9, and then is seen again in Year 10. In Year 9, around three-quarters of students are making less than the curriculum expectation of mean annual progress.

Figure 6 Distribution of mathematics annual progress at the end of the schooling year from the end of the previous year, from 2012 to 2016



To summarise what we have seen in the data above:

- Student achievement in mathematics increases overall from Year 4 to Year 10 of schooling. The annual progress decreases from Year 4 to Year 10 as year level increases;
- Mathematics achievement and progress at each year level is very consistent from 2011 to 2016, with no observed decrease or increase;
- Average mathematics achievement for students at Years 4 to 6 aligns with the expectations set by the New Zealand curriculum, but for later years the average achievement is lower than the set expectations. For example, by the end of Year 9 students are expected to be achieving at early level 5 of the New Zealand Curriculum. The data shows that median achievement is still well within Level 4;
- There is little change in achievement in mathematics between Years 8 and 9;
- The average annual progress is not sufficient to reach the expectations of the New Zealand Curriculum in the higher years of primary schooling and into secondary schooling;

- There is a large spread of achievement at any year level and the difference between highest and lowest achievement is larger at higher year levels of schooling. The difference between the lowest and the highest achievement at Year 8 is equivalent to more than 4 years of schooling;
- At every year at primary level there is a considerable proportion of students achieving at curriculum levels higher than the curriculum expectations. For example, at Year 8 just over 34% of students are achieving within level 5 of the curriculum;
- There is also a wide variation in the progress students make in a year of schooling, with some students showing progress of a whole curriculum level while others show no progress.

Comparison with other information

The discrepancy between achievement and expectations in the higher level of primary schooling is a concern already documented. *Mathematics Standards for Years 1 to 8* (from 2009) notes this discrepancy stating:

> Current data about the numeracy of adults in the workforce gives cause for concern. Significant proportions of New Zealand students in the upper primary years do not currently meet the expectations. Unless this situation is addressed, many of these students will not achieve in mathematics at a level that is adequate to meet the demands of their adult lives.[4]

The National Monitoring Study of Student Achievement (NMSSA) estimates the proportion of students at Year 8 in 2013 achieving at Level 4 of the New Zealand Curriculum or higher at 41%[5]. This is lower than the 70% estimated in our analysis for 2016. The proportion of Year 8 students at or above the National Standard was 70% in 2015[6].

Another source of triangulation is the Trends in International Mathematics and Science Study (TIMSS), which reports that many New Zealand Year 9 students were working at Level 4 of the curriculum by the end of the year, rather than Level 5 in 2014/15[7].

The impact of changing schools on mathematics achievement

A student's progress may be affected by transitions from one school to another. Many such transitions are also associated with changes in the type of school, such as from a primary school to a high school[8]. Challenges associated with moving to a new school environment might be one potential explanation for why there is so little change in average achievement in mathematics from Year 8 to Year 9. There are other potential explanations, e.g. a student's progress may differ by their age and stage of development.

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[4] The New Zealand Curriculum, Mathematics Standards for years 1-8 (Ministry of Education, 2009, p.6)

[5] National Monitoring Study of Student Achievement, Mathematics and Statistics 2013 (Educational Assessment Research Unit, University of Otago, 2015).

[6] https://www.educationcounts.govt.nz/statistics/schooling/national-standards/National_Standards

[7] https://www.educationcounts.govt.nz/__data/assets/pdf_file/0006/180339/TIMSS-2014-Science-Y9-Key-Findings.pdf

[8] http://www.educationcounts.govt.nz/__data/assets/pdf_file/0005/171905/Students-Achievement-as-they-Transition-from-Primary-to-Secondary-Schooling.pdf

Other factors to consider are whether teachers are using e-asTTle differently in Year 9 than Year 8 (perhaps to assess lower-performing students), and whether the Year 9 and 10 expected curriculum levels are correct. This is a research topic beyond the scope of this initial report.

Students also change schools outside the transition years between primary, intermediate and secondary schools. In those cases, it is possible that the characteristics and learning abilities of students who change schools differ to those who remain in the same school. For example, if a child has behavioural issues or learning challenges at one school that might precipitate a move to a new school. If that was a common reason for changing schools, then it would lead to lower observed achievement levels of children who changed schools.

Mean achievement in mathematics for the students who changed schools compared to the achievement of those who stayed are shown in Table 7, below. These results show some evidence of lower results for students who had changed schools since the previous year. Students who changed schools have lower overall achievement in mathematics than students who stayed at the same school. The differences are the smallest in the 'normal' transition years, when the majority of students change schools.

Table 7 Mean achievement scores in mathematics for students who had changed schools in the previous year compared to those who had stayed at the same school

Year level	Mean achievement scores in mathematics (e-asTTle points)			*N** *Changed school*	*N** *Same school*
	Changed school	*Same school*	*Difference in scores*		
4	1,375	1,395	21	1,657	18,710
5	1,423	1,436	13	2,188	23,374
6	1,454	1,471	17	2,018	23,887
7	1,501	1,506	4	43,927	13,146
8	1,509	1,537	27	3,565	55,451
9	1,546	1,556	10	66,065	12,696
10	1,556	1,583	26	4,038	61,164

Achievement scores are measured in e-asTTle points. Curriculum expectation on mean annual progress is 50 e-asTTle scale points. All observations have been pooled across 2011 to 2016.
Year 9 and Year 10 results have been weighted to adjust for the observed school decile bias
*The numbers of students who changed or stayed at the same school over the prior year are repeated from Table 7 to aid interpretation.

Progress and achievement in Reading and Writing

Summary

Reading achievement is consistent from 2011 to 2016.

Writing achievement is consistent from 2013 to 2016 onwards for Years 2 to 8. The changes to the writing tool in 2012 appear to have had a settling-in effect as teachers became more familiar with the tool. Therefore, 2012 results for writing should be treated with caution.

Median reading achievement for students at Years 4 to 7 aligns with curriculum expectations set by the New Zealand Curriculum but for Years 8 to 10, median achievement is lower than the level expected by the New Zealand Curriculum.

In writing, average achievement is lower than the expectations of the New Zealand Curriculum for Years 4 to 10.

Median achievement against curriculum expectations is higher in reading than in writing or mathematics. Writing has the lowest median achievement against curriculum expectations.

The spread of achievement is wider in writing than in mathematics and reading.

In reading and writing, at each year at primary school, there are considerable proportions of students achieving higher than the level expected by the New Zealand Curriculum, for some of them much higher.

Students make better progress in writing throughout primary school compared to reading. Annual progress in writing at the end of Year 8 is close to the expected value of ½ a curriculum level. The only significant dips in progress relative to curriculum expectation occur at Years 7 and 9, years where a student’s progress may be affected by moving to a new type of school. For reading (like mathematics), progress is progressively worse as the student moves through the year levels.

The results from this study show that median achievement in reading and writing against curriculum expectations are broadly consistent with results from the National Monitoring Study of Student Achievement (NMSSA).

As for mathematics, students who changed schools since the previous year have lower median achievement at the end of the year in reading and writing than students who stayed at the same school. The differences are the smallest in Year 7 when the majority of students changed schools.

Annual achievement and progress in reading by Year level

Figure 7 shows the distribution of achievement in reading for each year level at the end of school year from 2011 to 2016. This figure shows the spread of achievement of students at the same year level. The curriculum level bands are shown to allow interpretation of the scores against the expectations outlined in Figure 4.

Figure 7 Distribution of reading achievement at the end of the schooling year mapped to curriculum level (CL) from 2011 to 2016

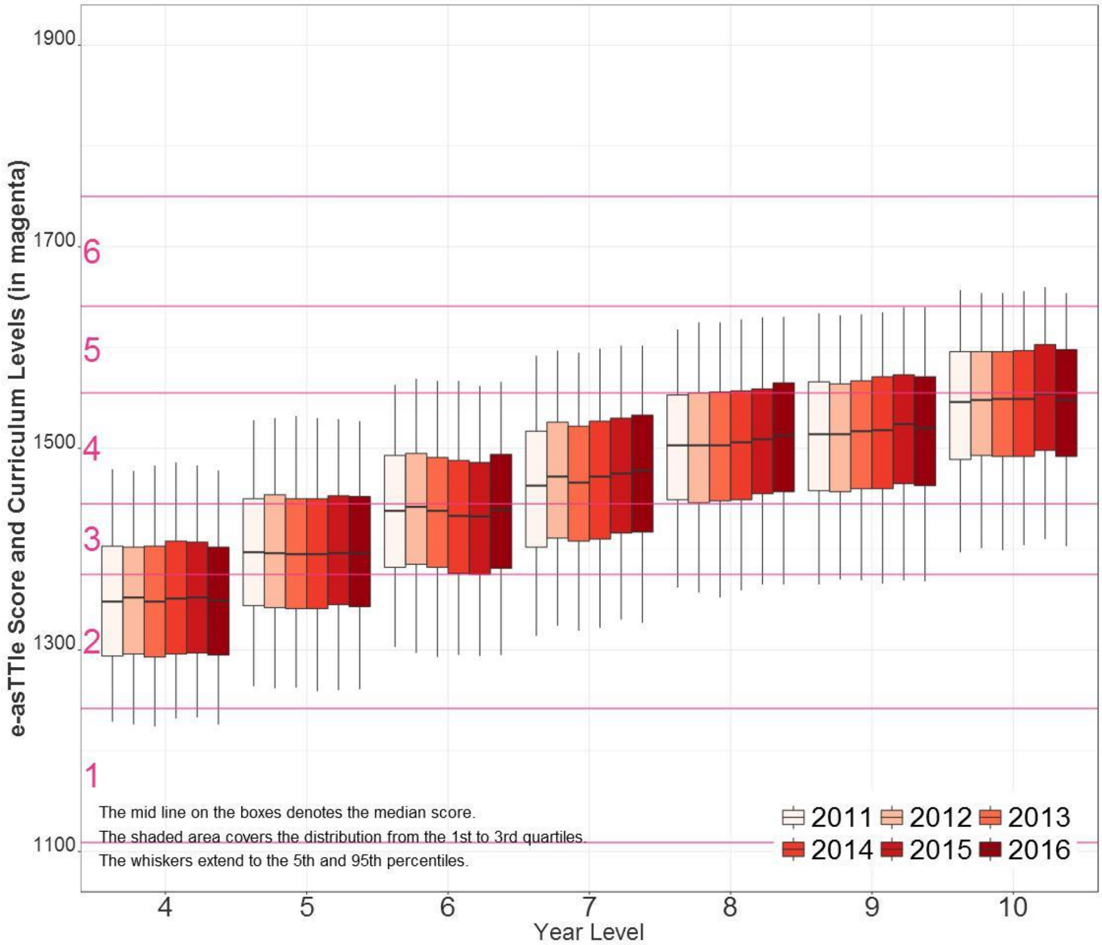
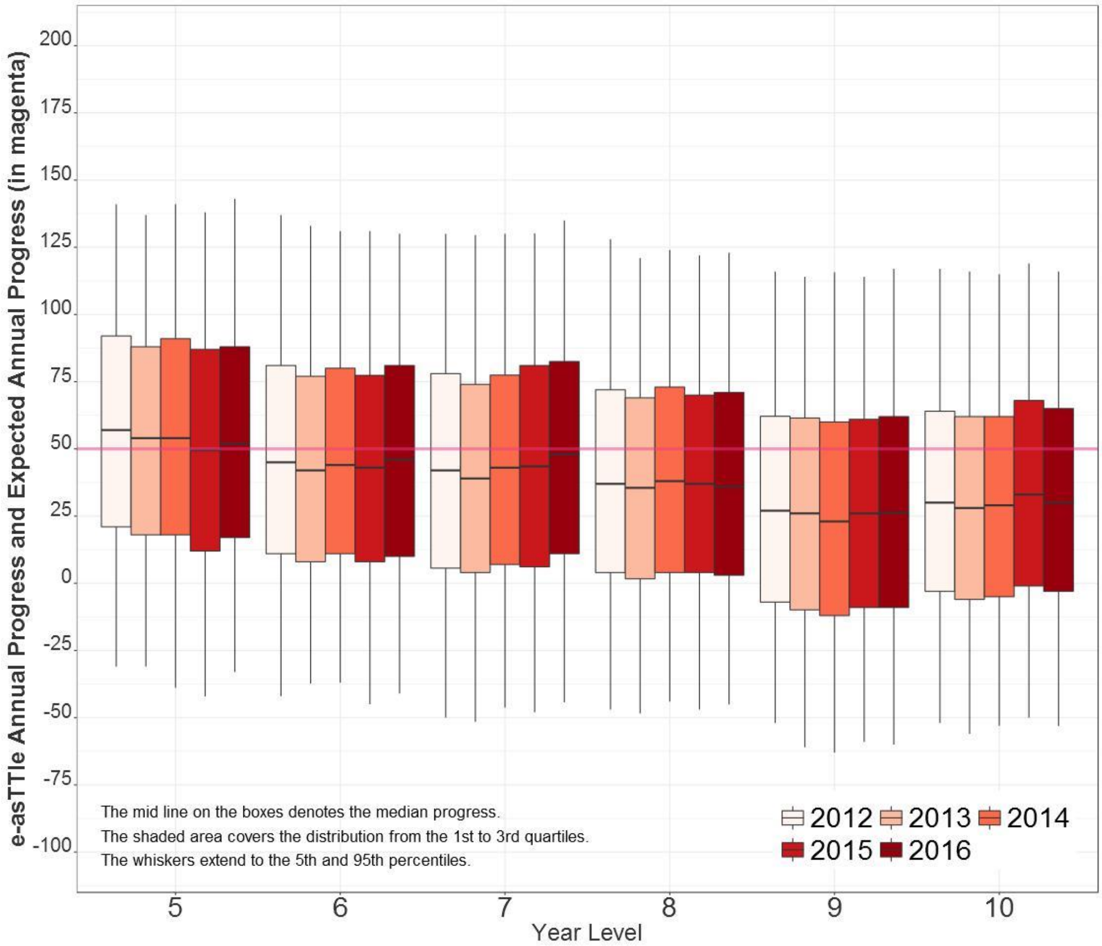


Figure 8 shows the distribution of annual progress in reading that students make in one year of schooling from their results from the previous year. The distributions are shown against the half a curriculum level benchmark which represent the average progress students need to make to keep up with the demands of the curriculum.

Figure 8 Distribution of reading annual progress at the end of the schooling year from the end of the previous year, from 2012 to 2016



As for mathematics, the trends in reading achievement and progress are very stable from 2012 to 2016.

The following conclusions can be drawn:

- The overall patterns in student achievement and progress in reading are similar to those observed for mathematics. Student achievement in reading increases overall from Years 4 to 10 of schooling. However, the rate of increase decreases from Years 4 to 10;
- Median reading achievement for students at Years 4 to 7 aligns with the curriculum expectations set by the New Zealand Curriculum but for Years 8 to 10 median achievement is lower than the level expected by the New Zealand Curriculum;
- At any year at primary level there are considerable proportions of students achieving at curriculum levels higher than the curriculum expectations, for some of them much higher;

- As for mathematics, the data show a large spread of achievement at every year level in reading. For example, at the end of Year 4 the difference between the highest and lowest achieving students represents at least 4 years of schooling;
- The mean annual progress is not sufficient to reach the expectations of the New Zealand curriculum at the end of secondary schooling. Half the students achieve below curriculum expectations in 2016 at Year 10.

The effect of changing schools on reading achievement

The difference in median reading achievement for students who had changed schools since the previous year and for those who had stayed at the same school is shown in Table 8. As for mathematics, students who changed schools since the previous year have lower overall achievement in reading than students who stayed at the same school. The differences are the smallest in Year 7 when the majority of students changed schools compared to other years when the majority of students remained at the same school.

Table 8 – Mean achievement scores in reading for students who had changed schools in the previous year compared to those who had stayed at the same school

Year level	Mean achievement scores in reading (e-asTTle points)			N*	N*
	Changed school	Same school	Difference in scores	Changed school	Same school
4	1,331	1,348	18	2,198	24,811
5	1,380	1,398	18	2,708	29,641
6	1,411	1,437	25	2,408	30,470
7	1,467	1,477	9	41,445	13,114
8	1,483	1,506	23	3,567	52,183
9	1,516	1,536	20	82,658	17,155
10	1,531	1,552	21	5675	85760

Achievement scores are measured in e-asTTle points. Curriculum expectation on mean annual progress is 50 e-asTTle scale points.
All observations have been pooled across 2011 to 2016.
Year 9 and Year 10 results have been weighted to adjust for the observed school decile bias
Numbers are rounded to the closest integer and differences have been calculated from unrounded scores.

Annual achievement and progress in writing by year level

Unlike the mathematics and reading tool, the e-asTTle writing tool allows assessment from Level 1 of the curriculum. Figure 13 shows the distribution of end of year achievement in writing for 2012-16.

Figure 9 Distribution of writing achievement at the end of the schooling year mapped to curriculum level (CL) from 2012 to 2016

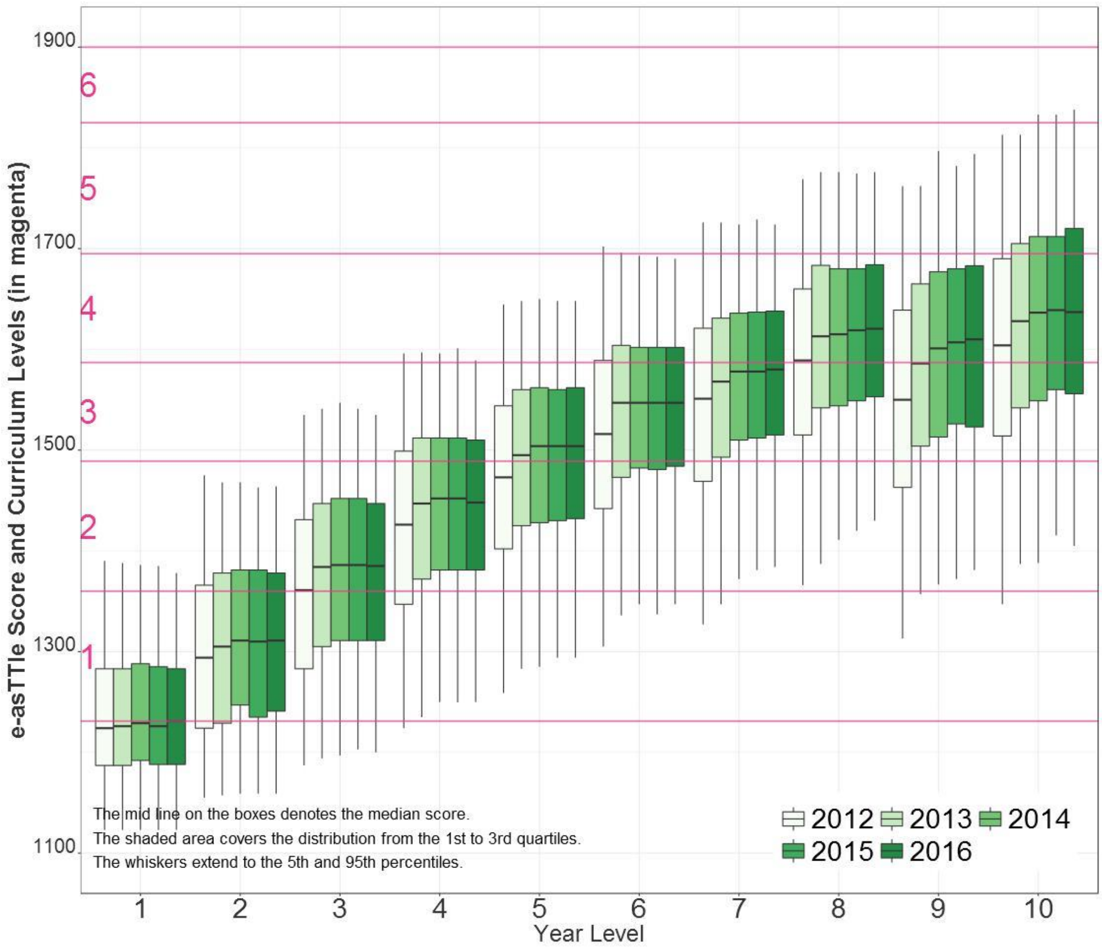
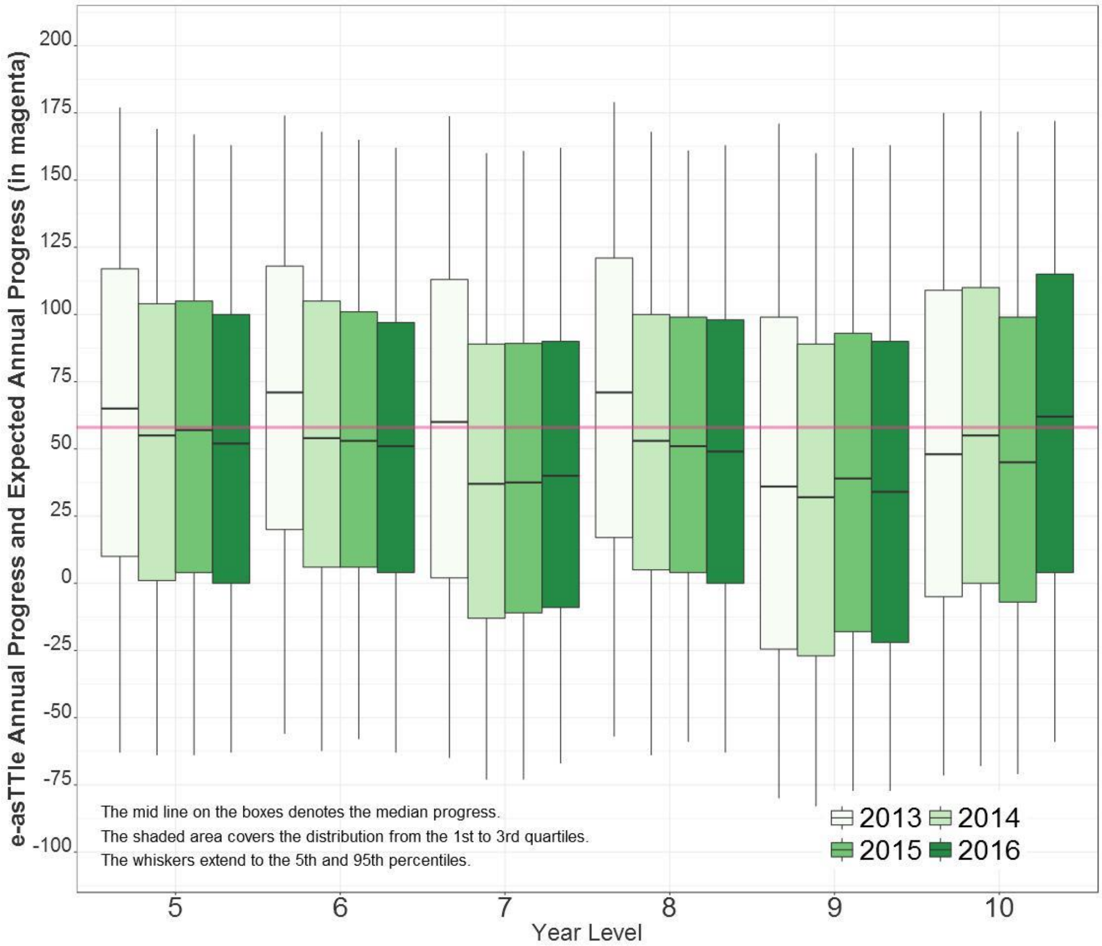


Figure 9 shows consistently lower average achievement in 2012 compared to 2013-16. From 2013 to 2016, the trends for Years 2 to 8 show stability. However, student achievement results in writing at secondary schooling show a steady increase and results in writing at year 1 show a decrease over time. The reason for these trends is not yet understood and further work is required to understand them. The trend observed at Year 1 is consistent with results from National Standards, which show a slight decline in the proportion of students achieving at or above standard after their first and seconds years in schooling between 2013 and 2015[9].

Figure 10 shows the distribution of annual progress in writing that students make in one year of schooling from their results from the previous year. The distributions are shown against the half a curriculum level benchmark (58 e-asTTle points in the case of writing) which represent the average progress students need to make to keep up with the demands of the curriculum.

[9] Information Kit: Student Achievement in New Zealand, Ministry of Education

Figure 10 Distribution of writing annual progress at the end of the schooling year from the end of the previous year, from 2013 to 2016



Some of the conclusions that can be drawn from the writing achievement and progress data are:

- The overall patterns in student achievement and progress in writing are similar to those observed for mathematics and reading. Student achievement in writing increases overall from Year 4 to Year 10 of schooling. The rate of increase decreases from Year 4 to Year 10 as year level increases;
- Median achievement in writing is lower than the expectations of the New Zealand Curriculum for Years 4 to 10;
- At the end of Year 4, although more than 25% of students are achieving within curriculum level 3 or above, another 25% are achieving below level 2;
- At the end of Year 8 student achievement in writing is lower than for reading and mathematics when compared against curriculum expectations. For writing, 65% of students in 2016 are achieving at or above curriculum expectations in writing, compared with 79% for reading and 70% for mathematics;
- The spread of achievement is wider in writing than in mathematics or reading. One potential reason for this is that writing tests are assessed by teachers and not by the tool as is the case for mathematics and reading;

- Students make better progress in writing throughout primary school compared to mathematics and reading. For example, progress in writing at the end of Year 8 since the previous year is close to the expected value of ½ a curriculum level. The only significant dips in progress relative to curriculum expectation occur at Years 7 and 9, years where a student's progress may be affected by moving to a new type of school. For mathematics and reading, progress is progressively worse as the student moves through the year levels.

The effect of changing schools on writing achievement

The difference in average writing achievement for students who had changed schools since the previous year and for those who had stayed at the same school is shown in Table 9. As for reading and mathematics, students who changed schools since the previous year have lower average achievement in writing than students who stayed at the same school. However, the size of the difference is generally larger for writing. The differences are the smallest in year 7 when the majority of students changed schools compared to other years when the majority of students remained at the same school.

Table 9 Mean achievement scores in writing for students who had changed schools in the previous year compared to those who had stayed at the same school

Year level	Mean achievement scores in writing (e-asTTle points)			N* Changed school	N* Same school
	Changed school	Same school	Difference in scores		
4	1,406	1,439	33	3,494	38,110
5	1,465	1,491	26	3,281	38,428
6	1,515	1,541	26	2,808	37,512
7	1,564	1,578	14	37,165	13,631
8	1,590	1,618	28	2,892	47,937
9	1,597	1,634	37	13,948	5,002
10	1,617	1,654	37	1,408	18,899

Achievement scores are measured in e-asTTle points. Curriculum expectation on mean annual progress is 50 e-asTTle scale points.
All observations have been pooled across 2013 to 2016.
Year 9 and Year 10 results have been weighted to adjust for the observed school decile bias
Numbers are rounded to the closest integer and differences have been calculated from unrounded scores.
.

In 2012 the National Monitoring Study of Student Achievement (NMSSA)[10] assessed achievement of Year 4 and Year 8 students in writing. The study found that:

> Year 4 students' writing scores ranged across curriculum Levels 1 to 3 with the greatest proportion scoring in Level 2. Year 8 students' writing scores ranged across curriculum Levels 2 to 4 with the greatest proportion achieving in Level 3. The Year 4 result is in line with end of year NZC expectations, while the Year 8 result is below NZC expectations.

The results from the e-asTTle data shown in this report are consistent with the NMSSA findings at Year 4 and appear to be slightly better than NMSSA results for Year 8 (e-asTTle results range from Levels 2 to 5 and the greatest proportion achieve in the Level 4 band).

[10] National Monitoring Study of Student Achievement, English: Writing 2012, Ministry of Education, 2013

Achievement and progress by student and school characteristics

Summary

Average achievement in mathematics, reading and writing is lower for students studying in lower decile schools and, for students of Pasifika and Māori ethnicity compared to Pākehā ethnicity.

Reading and writing average achievement scores are lower for boys than for girls. The results do not show a gender difference for mathematics average achievement.

The variation of achievement is wide for all these sub-groups of students.

The variation in achievement observed in the e-asTTle data is broadly consistent with NMSSA results.

Annual progress in mathematics, reading and writing shows no systematic variation by school decile or ethnicity. Therefore, the differences in achievement by school decile, gender and ethnicity observed at higher levels of primary school reflect different starting points rather than differing progress throughout Years 4 to 8.

The e-asTTle dataset contains information on the characteristics of the students that are assessed with the tool and the school they come from. In this section, achievement of some subgroups of students is reported and compared against curriculum levels and differences between subgroups are described. This analysis is descriptive in nature and does not attempt to establish why subgroups might differ in their achievement levels.

The sub-group analysis reported in this section has concentrated on primary school students (Years 4 to 8) because for secondary students some of the interest subgroups were not representative of that subgroup in the New Zealand population. The annual progress distributions have been generated putting together all the end of year test results across the years. This decision was made to increase the size of the dataset and reduce random variation and because achievement trends are stable across time at these year levels.

Achievement and progress by gender

Figures 11 to 16 compare the distribution of average achievement and annual progress for girls and boys for mathematics, reading and writing and for Year 4 to Year 8 students.

Figure 11 Average achievement in mathematics at the end of the schooling year from 2011 to 2016 for girls and boys

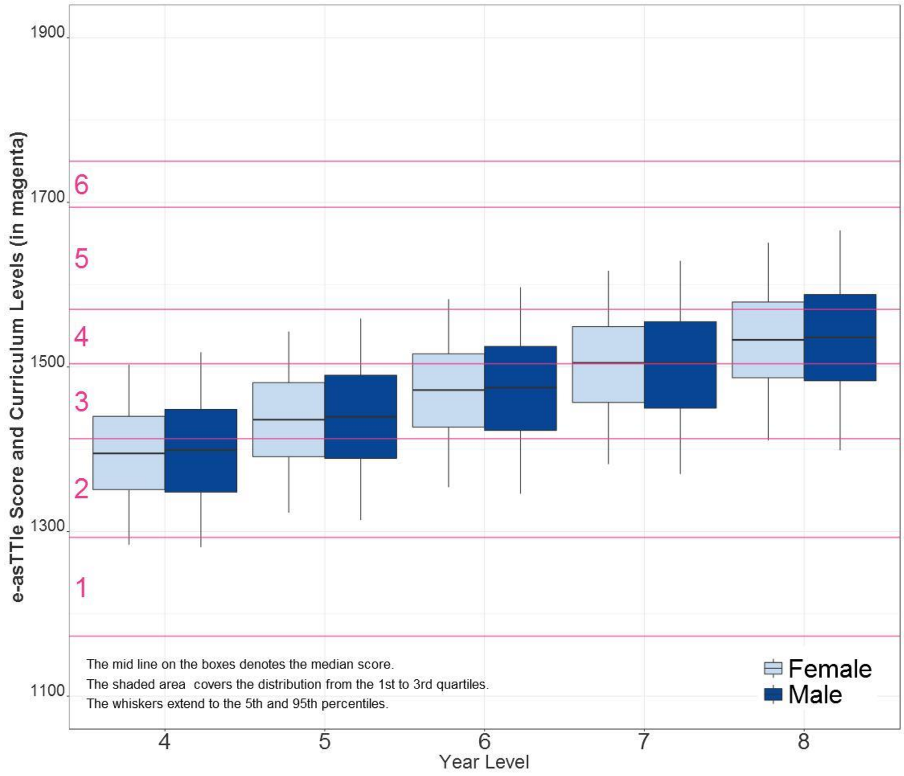


Figure 12 Annual progress in mathematics at the end of the schooling year from 2012 to 2016 for girls and boys

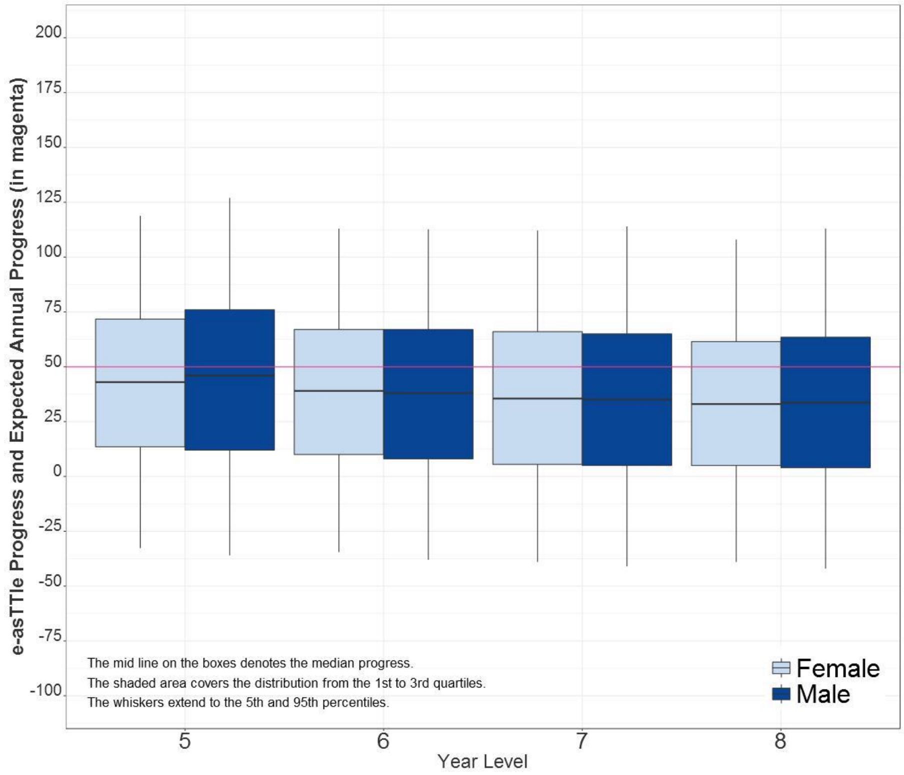


Figure 13 **Average achievement in reading at the end of the schooling year from 2011 to 2016 for girls and boys**

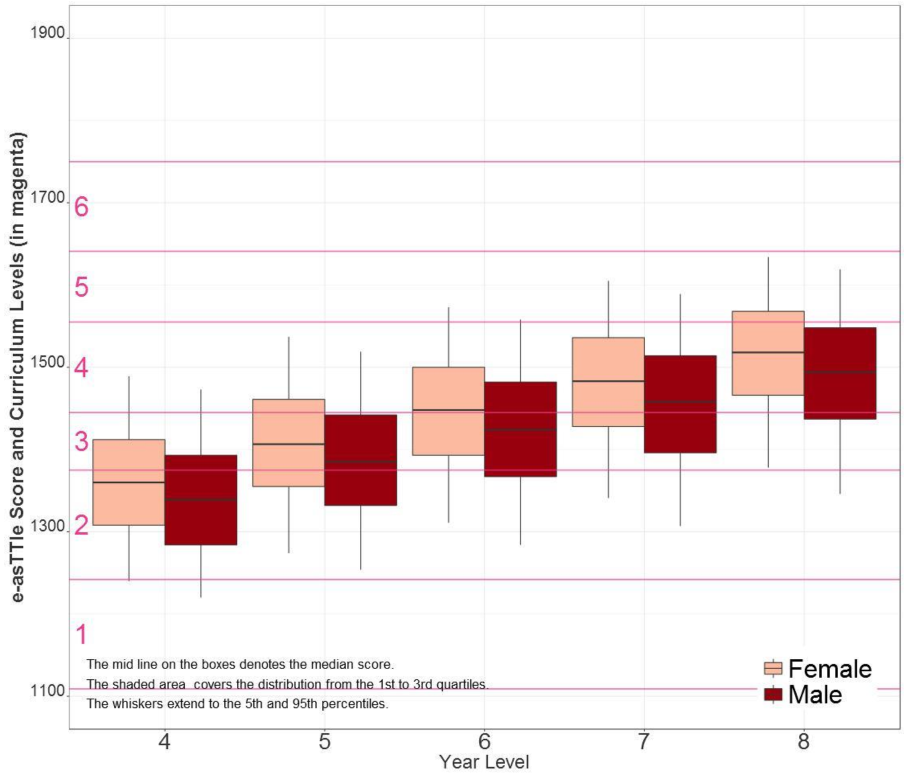


Figure 14 **Annual progress in reading at the end of the schooling year from 2012 to 2016 for girls and boys**

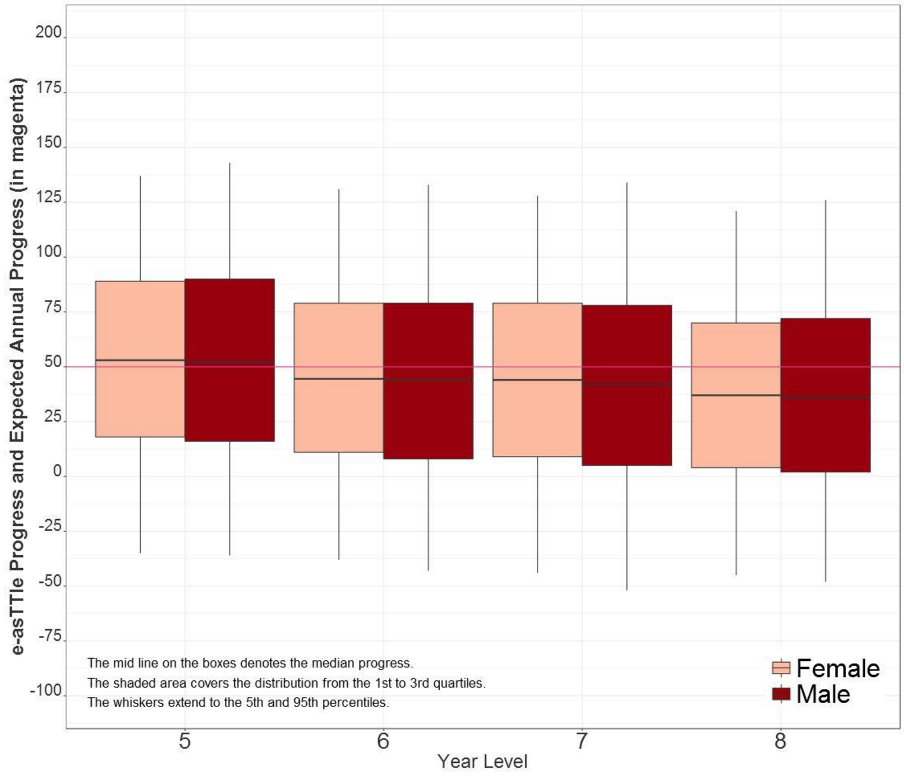


Figure 15 Average achievement in writing at the end of the schooling year from 2013 to 2016 for girls and boys

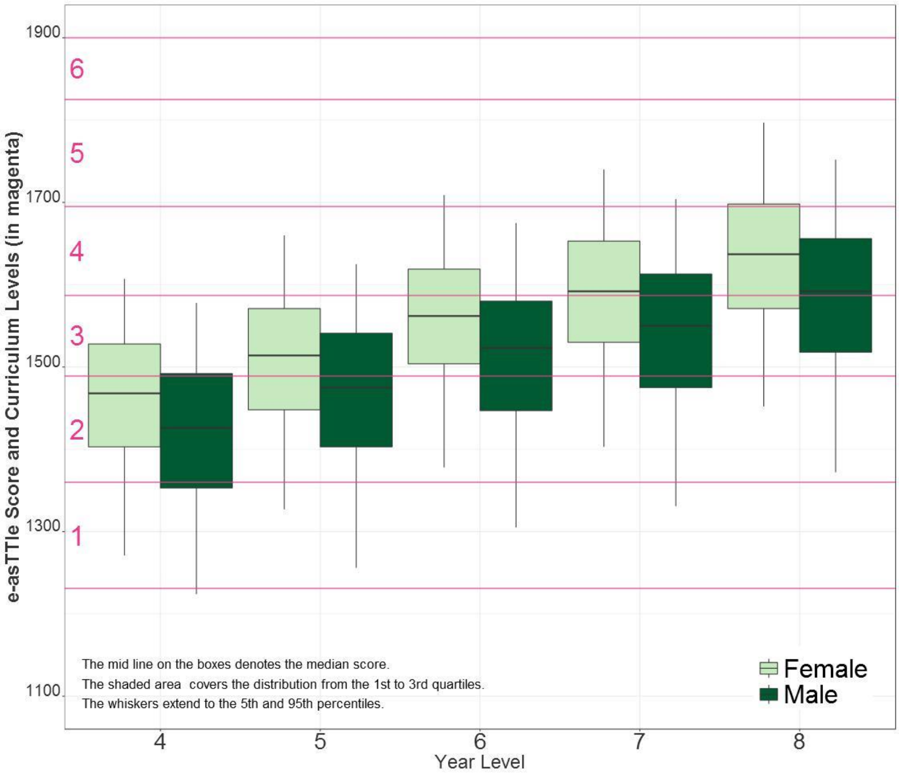
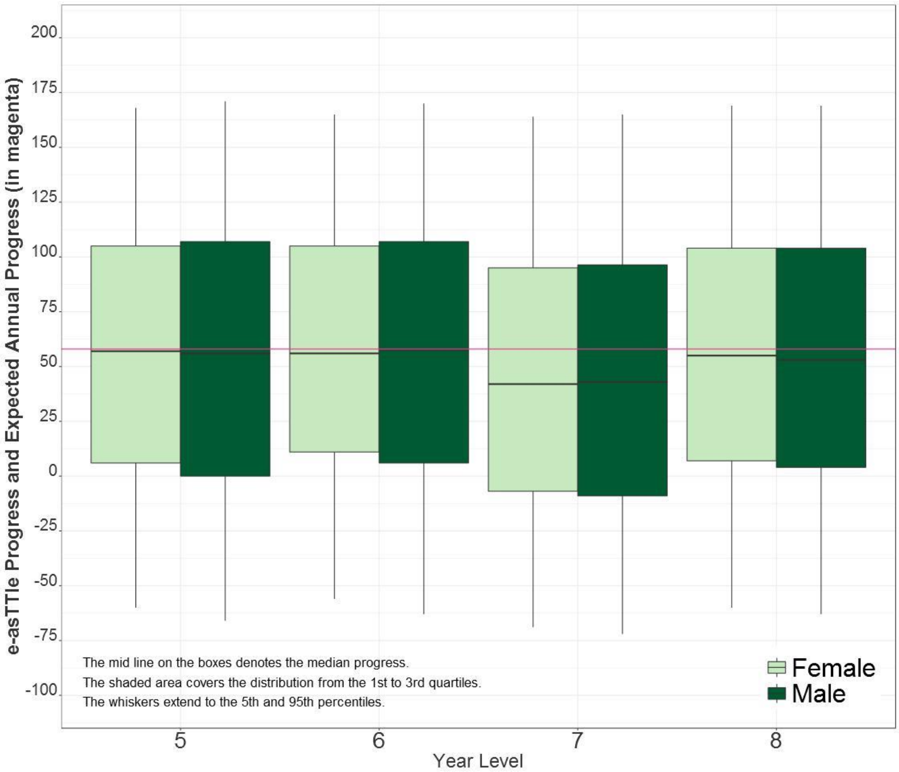


Figure 16 Annual progress in writing at the end of the schooling year from 2013 to 2016 for girls and boys



Summary

- Average achievement in mathematics is similar for girls and boys during primary schooling. For reading and writing the average achievement for girls is higher than for boys;
- Although at the end of Year 8 the average achievement score for girls in writing is within curriculum level 4, on average boys are only just achieving at level 4 and almost half the boys are achieving below level 4;
- The difference in average achievement in writing between girls and boys is just under half a curriculum level or one year of schooling. The difference in average achievement between girls and boys is slightly larger in writing than in reading;
- The difference in achievement in writing and reading between girls and boys is maintained over the years of primary schooling;
- There is no difference in annual progress between girls and boys in all three learning areas. Therefore, the differences in achievements observed at higher levels of primary school reflect different starting points for boys and girls rather than differing progress throughout Years 4 to 8.

Comparison with other findings

The gender disparity in reading and writing achievement with girls outperforming boys is well documented from different sources of data and has been consistent over time. New Zealand has been reported in international studies as being amongst the countries with larger gender differences in reading (PIRLS, PISA). The 2012 NMSSA study also reported girls have higher average achievement than boys in writing.

PISA 2012 reported that New Zealand 15 year old boys had higher mathematics average score than girls, although this difference was small. Trends in International Mathematics and Science Study (TIMSS) in 2014/15 showed that Year 9 boys and girls achieved similarly with boys having more variance. Boys' achievement has remained relatively constant since 1994 whilst girls' achievement had a significant decrease between 2002/03 and 2010/11, followed by a significant increase between 2010/11 and 2014/15 – back to the same level as 2002/03.[11]

The asTTle from 2000-2004 reported that although girls started off at Year 5 with a distinct average advantage over boys in total reading achievement, this difference halved by the end of primary school. The data in this current report shows that the difference in achievement is maintained as student progress through the years of schooling.

Achievement and progress by ethnicity

As is well documented, the number of Māori and Pasifika students who attend low decile schools is much higher than the number of those that attend high decile schools. This report shows the average achievement and progress in mathematics, reading, and writing of students (Figures 17-22) of different ethnicities without controlling for socio-economic background (as measured by school decile). The

[11] http://www.educationcounts.govt.nz/__data/assets/pdf_file/0019/180343/TIMSS-2014-Maths-Y9-Key-Findings.pdf

ethnicity data in the e-asTTle datasets comes from the school's student management systems and contains only one ethnicity per student.

Figure 17 Achievement distribution in mathematics at the end of the schooling year from 2011 to 2016 for different ethnicity groups

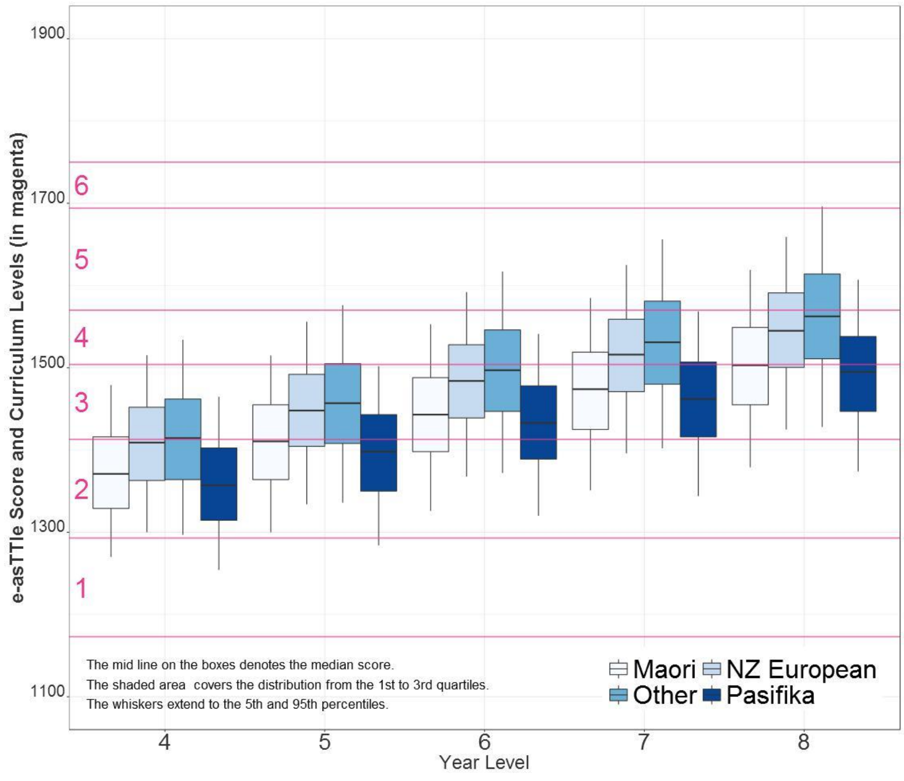


Figure 18 Annual Progress in mathematics at the end of the schooling year from 2012 to 2016 for different ethnicity groups

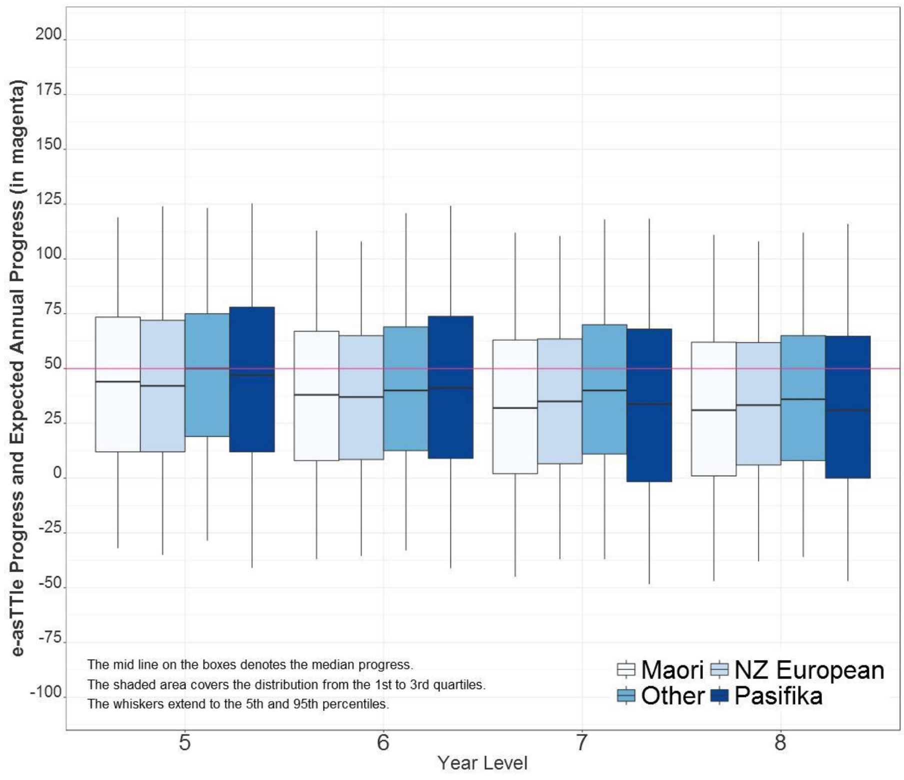


Figure 19 Reading distribution of achievement at the end of the schooling year from 2011 to 2016 for different ethnicity groups

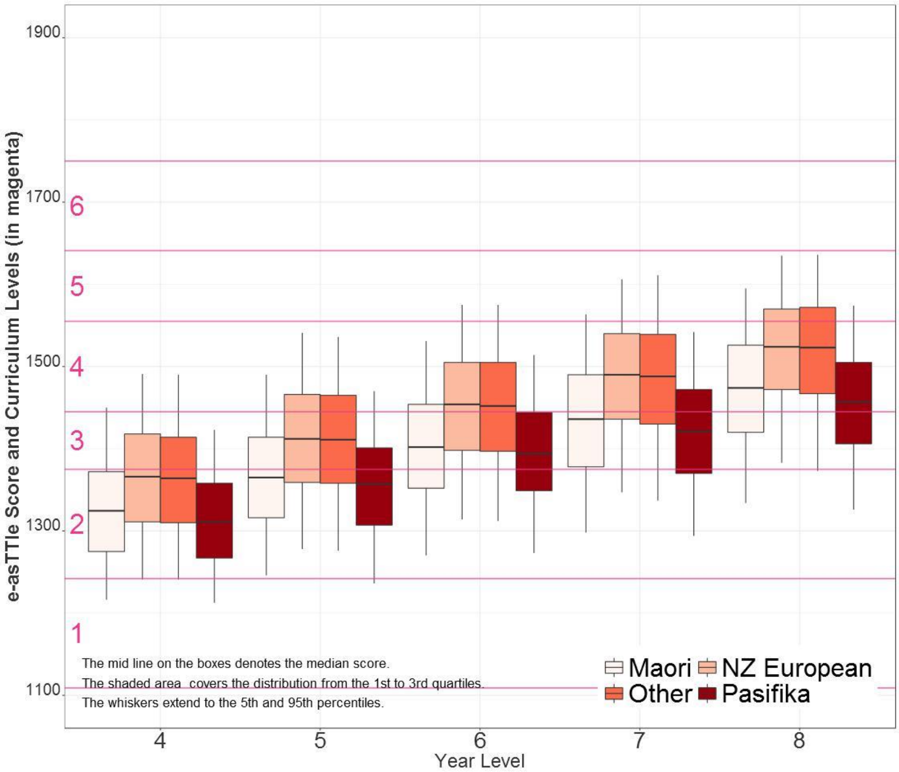


Figure 20 Annual progress in reading at the end of the schooling year from 2012 to 2016 for different ethnicity groups

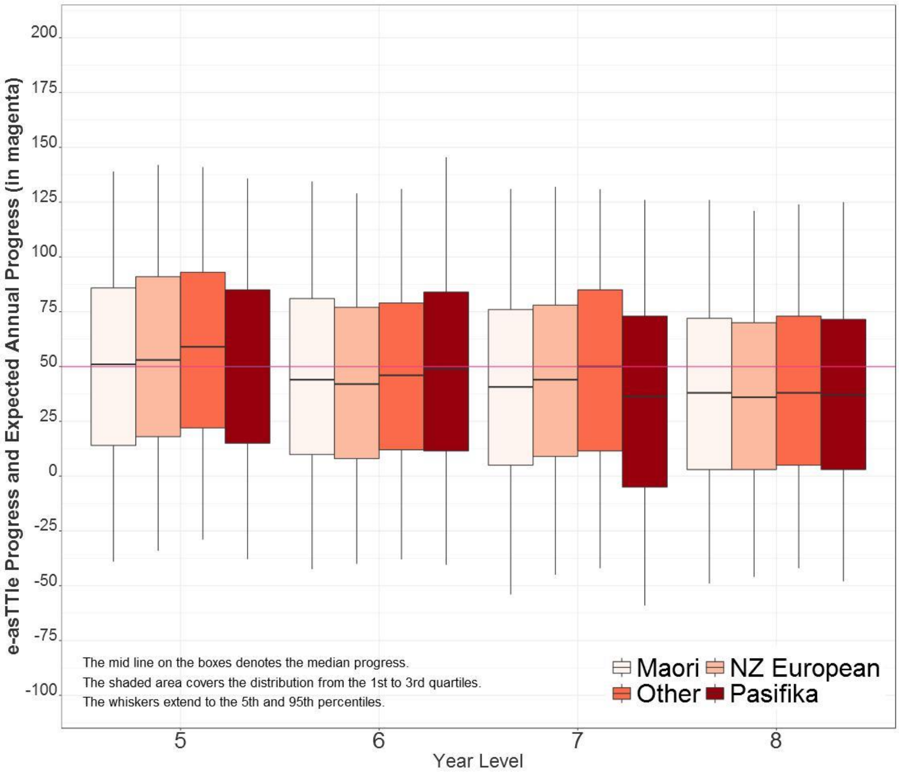


Figure 21 Writing distribution of achievement at the end of the schooling year from 2013 to 2016 for different ethnicity groups

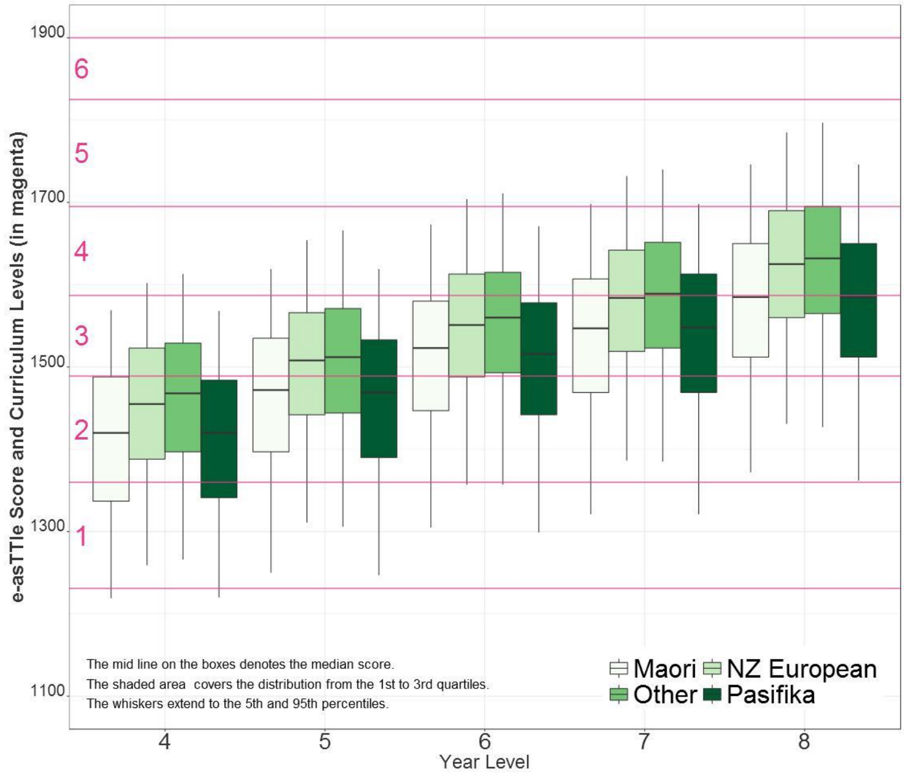
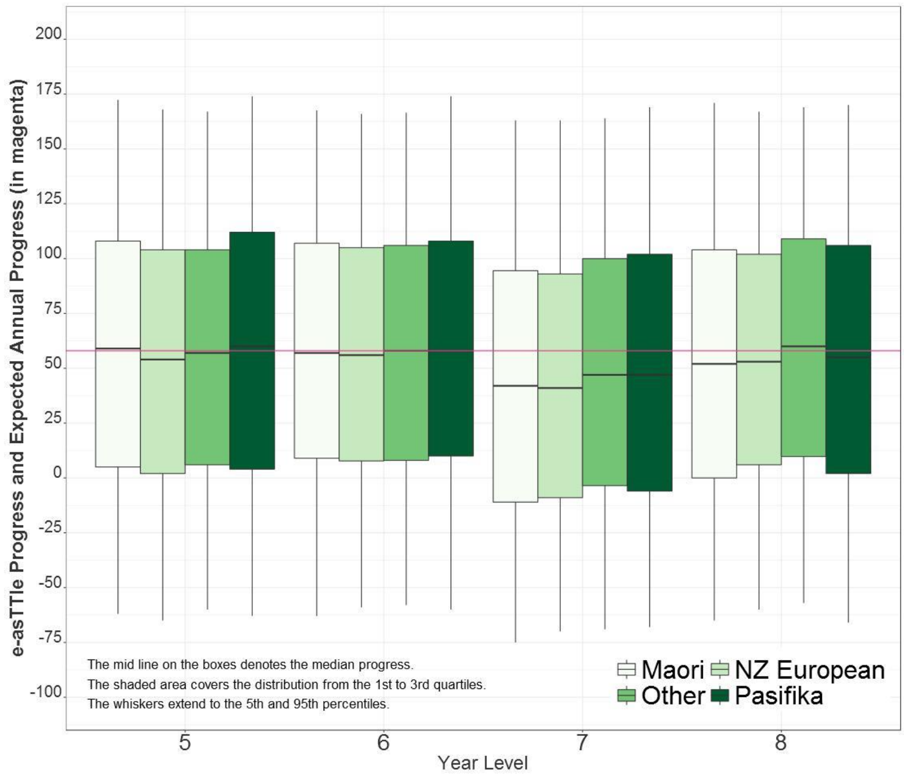


Figure 22 Annual Progress in writing from 2013 to 2016 for different ethnicity groups



Summary

- Average achievement in mathematics, reading and writing is higher for New Zealand/Pakeha students than for Māori or Pasifika students.
- There is little difference in average achievement in writing between Māori and Pasifika students.
- For mathematics and reading the average achievement of Māori students is higher than the average achievement of Pasifika students.
- There is no clear systematic difference in progress for different ethnicity subgroups in any of the three learning areas.

Comparison with other findings

Similar variation in achievement by ethnicity group has been reported in international studies and the NMSSA study. The asTTle data from 2000 to 2004 also showed these differences.

Achievement and progress by socio-economic status (SES)

School decile is currently a measurement for SES. A decile is a 10% grouping. There are ten deciles and around 10% of schools are in each decile. A school's decile rating indicates the extent to which it draws its students from low socio-economic communities. Decile 1 schools are the 10% of schools with the highest proportion of students from low socio-economic communities, whereas decile 10 schools are the 10% of schools with the lowest proportion of these students.

Figures 23-28 show average achievement and progress in mathematics, reading, and writing for students of different SES groups (as measured by school decile).

Figure 23 Achievement distribution in mathematics at the end of the schooling year from 2011 to 2016 for students from different SES groups

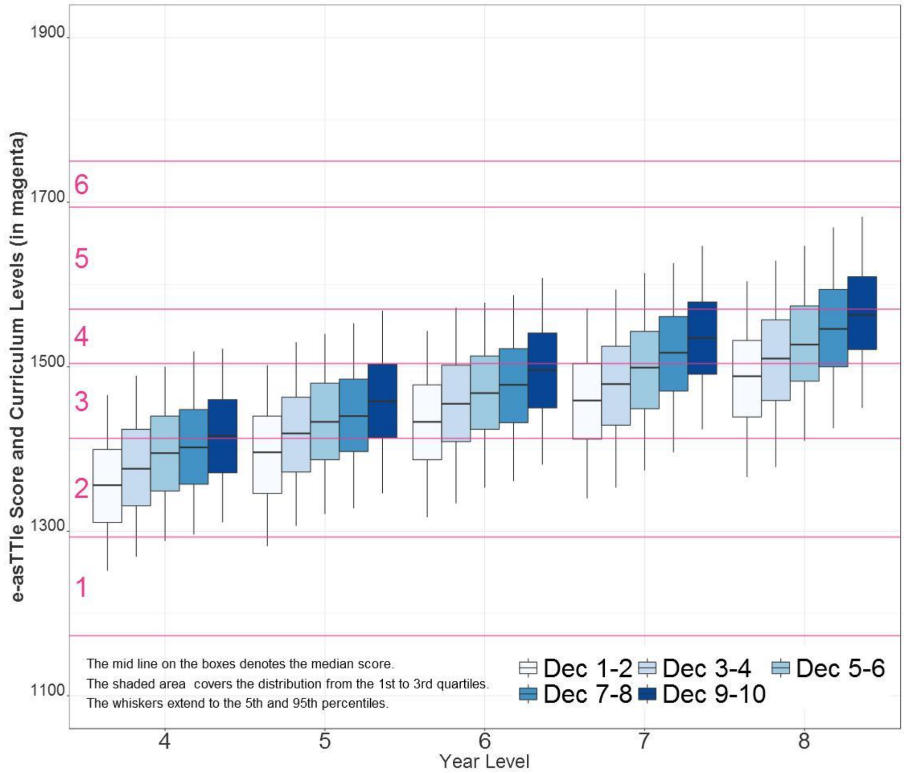


Figure 24 Annual progress in mathematics at the end of the schooling year from 2012 to 2016 for students from different SES groups

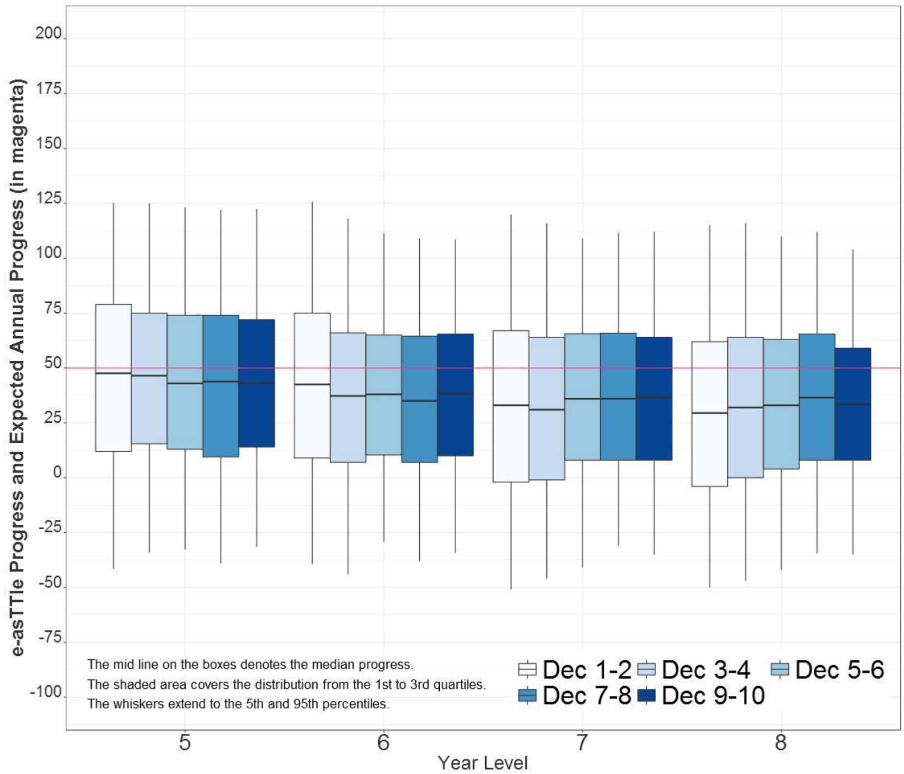


Figure 25 Achievement distribution in reading at the end of the schooling year from 2011 to 2016 for students from different SES groups

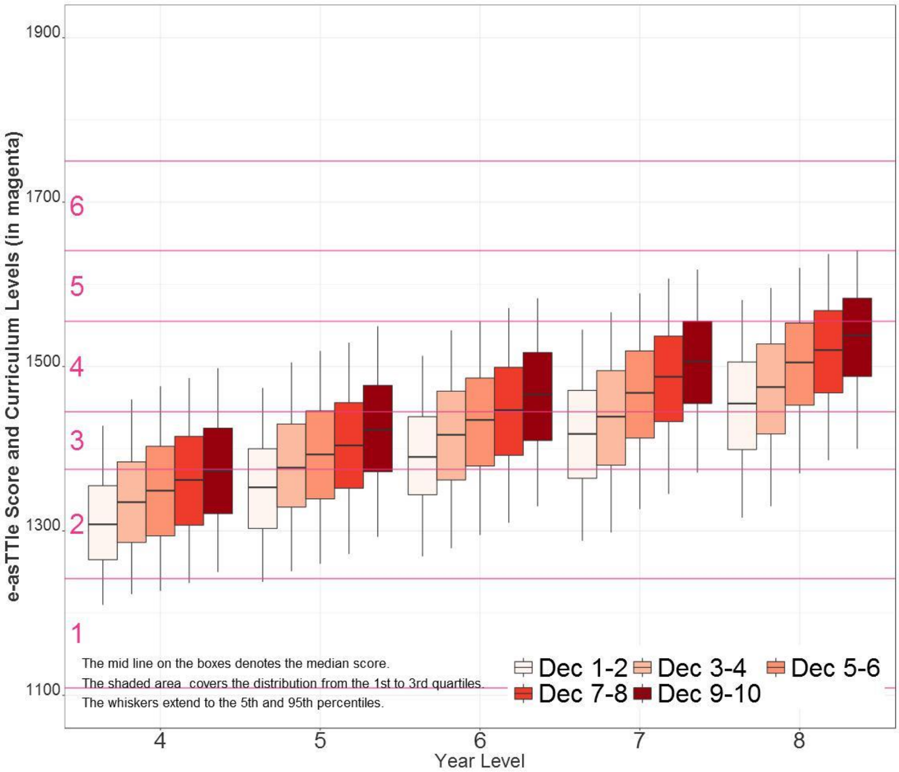


Figure 26 Annual progress in reading at the end of the schooling year from 2012 to 2016 for students from different SES groups

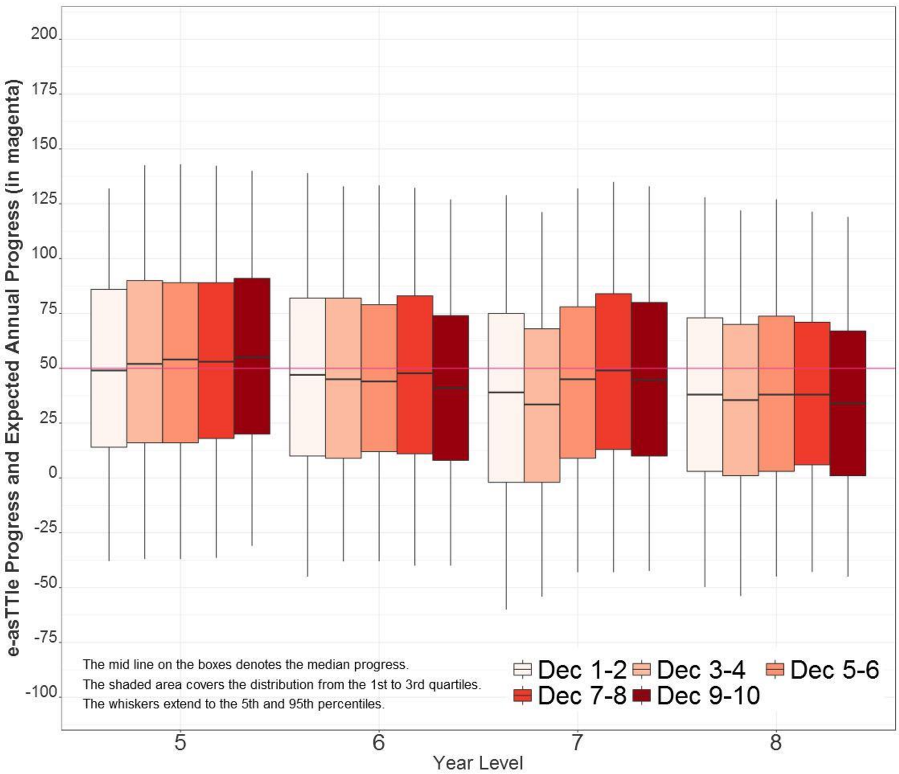


Figure 27 Achievement distribution in writing at the end of the schooling year from 2012 to 2016 for students from different SES groups

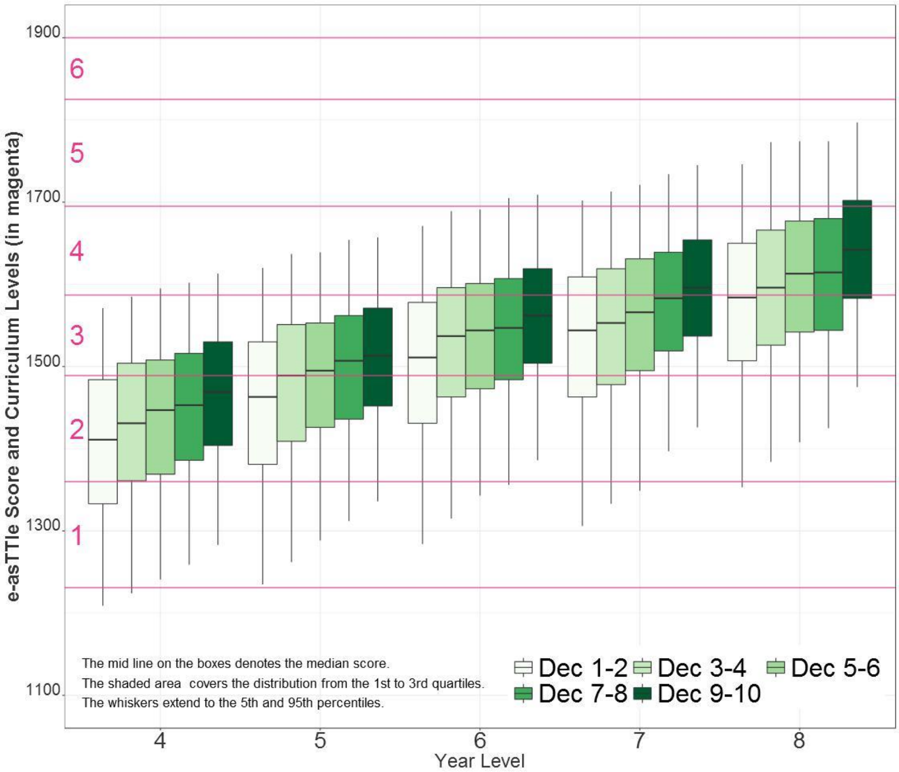
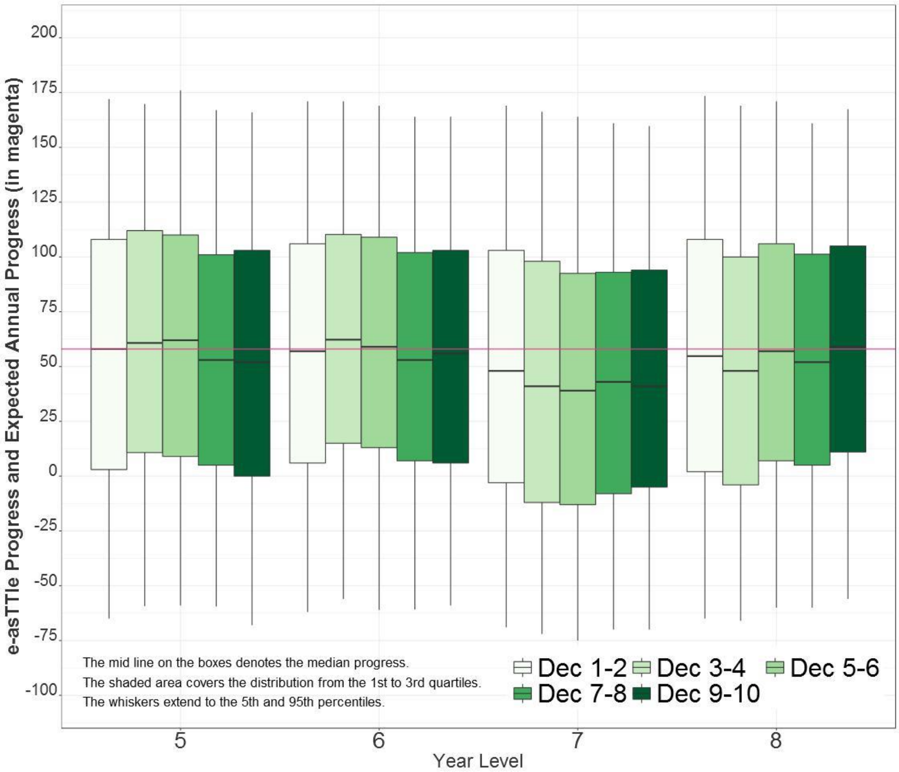


Figure 28 Annual progress in writing at the end of the schooling year from 2013 to 2016 for students from different SES groups



Summary

- There is a clear positive relationship between average achievement at primary school and school decile;
- Average achievement in the three learning areas is highest for students in higher decile schools, i.e., highest in those schools with the smallest proportion of students from low socio-economic communities;
- Annual progress does not show the same relationship with school decile. Students at higher decile schools have similar levels of annual progress on average to students at low decile schools in all three learning areas;
- The low average achievement levels for students at low decile schools compared with high decile schools are explained by their relatively low starting achievement levels rather than a smaller level of progress throughout primary school;
- The difference in average achievement between students in the low decile group and those in the high decile group is on average half a curriculum level, or 1 year of schooling in the three learning areas;
- These differences are larger in mathematics and reading than in writing. In reading, this difference is exacerbated as the children progress through the year levels.

Comparison with other findings

Differences in writing average achievement by school decile were reported in the 2012 NMSSA that showed that for both Year 4 and Year 8 student average achievement was lower for students from lower decile schools.

The 2000-2004 asTTle data reported in the *Information Kit: Student Achievement in New Zealand*, showed a similar pattern for reading and mathematics with lower average achievement for primary students in lower decile schools. In writing there was no definite trend.

Appendix 1 – Additional tables

Appendix Table 1 - Number and proportion of students assessed using the e-asTTle tool from November 1 to the end of the year in mathematics

Year Level	Mathematics – Achievement dataset											
	Number of students						*Percentage of all students in year level*					
	2011	2012	2013	2014	2015	2016	2011	2012	2013	2014	2015	2016
4	2,846	3,440	4,004	2,876	3,543	4,297	5%	6%	7%	5%	6%	7%
5	4,000	4,234	4,546	3,693	4,165	5,703	7%	7%	8%	6%	7%	9%
6	4,321	4,620	4,617	3,861	3,975	5,259	7%	8%	8%	7%	7%	9%
7	9,325	10,722	9,867	9,315	9,326	10,574	13%	16%	15%	14%	14%	16%
8	9,630	11,480	10,568	9,450	9,235	10,334	16%	19%	18%	16%	16%	18%
9	11,605	11,734	14,787	15,259	13,144	14,805	20%	20%	25%	26%	23%	26%
10	9,132	10,691	10,661	12,706	12,064	12,386	15%	18%	19%	21%	21%	21%

Appendix Table 2 Number and proportion of students assessed using the e-asTTle tool from November 1 to the end of the year in reading

Year Level	Reading– Achievement dataset											
	Number of students						*Percentage of all students in year level*					
	2011	2012	2013	2014	2015	2016	2011	2012	2013	2014	2015	2016
4	3,752	4,878	4,959	4,120	4,846	5,221	7%	8%	9%	7%	8%	8%
5	4,481	5,027	5,839	4,957	6,061	6,917	8%	9%	10%	9%	10%	11%
6	5,190	5,294	5,927	5,050	5,643	6,690	9%	9%	11%	9%	10%	11%
7	7,477	10,409	9,176	9,769	9,079	10,494	11%	15%	14%	15%	14%	16%
8	7,923	10,672	9,373	9,956	8,469	10,915	14%	18%	16%	17%	15%	19%
9	18,852	17,401	19,130	16,912	14,735	15,719	32%	30%	32%	29%	26%	28%
10	16,274	17,063	15,892	16,382	14,697	14,156	28%	29%	28%	28%	25%	25%

Appendix Table 3 - Number and proportion of students assessed using the e-asTTle tool from October 15 to the end of the year in writing

Writing– Achievement dataset										
Year Level	*Number of students*					*Percentage of all students in year level*				
	2012	2013	2014	2015	2016	2012	2013	2014	2015	2016
1	5,013	7,075	6,359	6,602	8,480	8%	11%	10%	10%	13%
2	5,733	8,191	8,611	8,151	9,707	10%	14%	14%	13%	15%
3	6,709	8,983	8,966	9,619	10,799	12%	16%	15%	15%	17%
4	8,123	10,655	10,621	9,908	12,569	14%	19%	18%	16%	19%
5	8,182	10,699	10,564	10,362	12,167	14%	19%	19%	18%	20%
6	8,857	10,413	9,910	10,147	11,827	16%	19%	17%	18%	20%
7	10,097	13,534	12,569	12,579	14,481	15%	21%	19%	19%	22%
8	10,094	13,675	13,302	12,454	13,383	17%	23%	23%	22%	23%
9	4,850	5,026	5,850	4,062	4,837	8%	9%	10%	7%	8%
10	3,822	4,254	4,712	4,019	4,457	6%	7%	8%	7%	8%

Appendix Table 4 – The number and proportion of students who have been tested for Mathematics at the end of the school year, by school decile and year levels

Mathematics– Achievement dataset						
Decile level	*Number of students*			*Proportion of students in year level groups*		
	All	Primary Years 1 -8	Secondary Years 9-10	All	Primary Years 1 - 8	Secondary Years 9-10
1	21,854	14,215	7,628	7%	6%	22%
2	22,769	11,489	11,277	7%	5%	27%
3	31,249	14,375	16,873	9%	7%	35%
4	27,907	13,450	14,449	7%	5%	22%
5	33,133	17,253	15,794	8%	7%	24%
6	42,754	21,744	20,986	9%	9%	23%
7	31,534	17,889	13,567	7%	7%	19%
8	38,652	23,540	15,106	8%	8%	17%
9	49,794	29,618	20,141	9%	9%	25%
10	46,490	33,330	13,152	7%	7%	16%

Appendix Table 5 – The number and proportion of students who have been tested for Reading at the end of the school year, by school decile and year levels

Reading– Achievement dataset						
	Number of students			*Proportion of students in year level groups*		
Decile level	All	Primary Years 1 -8	Secondary Years 9-10	All	Primary Years 1 -8	Secondary Years 9-10
1	27,285	16,710	10,554	8%	7%	31%
2	33,041	15,122	17,881	10%	6%	42%
3	34,969	15,410	19,528	10%	7%	41%
4	42,138	15,949	26,183	11%	6%	42%
5	38,804	19,348	19,199	9%	7%	30%
6	56,682	25,680	30,852	12%	10%	34%
7	40,118	19,017	21,037	9%	7%	27%
8	42,144	21,649	19,965	8%	7%	23%
9	43,077	25,955	17,076	8%	8%	20%
10	52,679	37,739	14,934	8%	8%	18%

Appendix Table 6 – The number and proportion of students who have been tested for Writing at the end of the school year, by school decile and year levels

Writing– Achievement dataset						
	Number of students			*Proportion of students in year level groups*		
Decile level	All	Primary Years 1 -8	Secondary Years 9-10	All	Primary Years 1 -8	Secondary Years 9-10
1	47,598	42,348	5,249	17%	21%	19%
2	44,525	37,843	6,676	16%	19%	20%
3	39,000	32,647	6,352	14%	18%	16%
4	37,285	34,027	3,257	11%	17%	9%
5	42,932	37,660	5,239	12%	17%	10%
6	40,909	33,288	7,515	11%	16%	10%
7	42,049	38,341	3,707	11%	17%	7%
8	37,194	33,076	4,104	9%	13%	6%
9	50,216	46,697	3,467	11%	16%	5%
10	64,255	63,932	323	12%	17%	1%

Appendix Table 7 - Number and proportion of students assessed in mathematics at the end of the school year who were also tested at the end of the previous school year

Mathematics - Progress dataset (November to November)										
	Number of students					*Percentage of all students in year level*				
Year Level	2012	2013	2014	2015	2016	2012	2013	2014	2015	2016
5	2,241	2,488	2,159	2,221	1,805	4%	4%	4%	4%	3%
6	2,543	2,646	2,275	2,209	1,756	5%	5%	4%	4%	3%
7	6,168	5,821	5,456	5,917	1,412	9%	9%	8%	9%	2%
8	7,172	7,385	6,485	6,164	5,473	12%	12%	11%	11%	9%
9	7,726	10,027	10,164	9,165	2,955	13%	17%	17%	16%	5%
10	6,593	6,551	8,330	8,204	7,773	11%	11%	14%	14%	13%

Appendix Table 8 - Number and proportion of students assessed in reading at the end of the school year who were also tested at the end of the previous school year

Reading – Progress dataset (November to November)										
	Number of students					*Percentage of all students in year level*				
Year Level	2012	2013	2014	2015	2016	2012	2013	2014	2015	2016
5	3,169	3,220	2,859	3,348	1,917	6%	6%	5%	6%	3%
6	3,067	3,425	2,982	2,968	2,645	5%	6%	5%	5%	4%
7	5,418	5,635	5,199	5,306	1,779	8%	9%	8%	8%	3%
8	6,336	6,391	6,658	5,690	4,724	11%	11%	11%	10%	8%
9	10,209	12,745	10,684	10,504	3,271	18%	21%	18%	18%	6%
10	10,128	8,951	10,922	8,968	8,786	17%	15%	18%	15%	15%

Appendix Table 9 - Number and proportion of students assessed in writing at the end of the school year who were also tested at the end of the previous year

Writing – Progress dataset (November to November)								
Year Level	*Number of students*				*Percentage of all students in year level*			
	2013	2014	2015	2016	2013	2014	2015	2016
2	5,089	5,672	5,811	3,703	8%	9%	9%	6%
3	6,015	6,336	6,857	4,568	10%	10%	11%	7%
4	7,022	7,199	7,197	5,368	12%	12%	12%	8%
5	7,292	7,709	7,879	5,494	13%	13%	13%	9%
6	6,629	7,030	7,173	5,948	12%	12%	13%	10%
7	8,950	8,529	8,739	4,240	14%	13%	13%	6%
8	7,152	7,927	7,586	7,327	12%	14%	13%	12%
9	3,154	3,791	2,640	1,650	5%	6%	5%	3%
10	1,623	2,552	2,590	2,196	3%	4%	4%	4%

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