MINISTRY OF EDUCATION
TE TĀHUHU O TE MĀTAURANGA

Education Report: Release of the 2018 National Monitoring Study of Student Achievement (NMSSA) Reports

To:	Hon Chris Hipkins, Minister of Education		
Date:	30 October 2019	**Priority:**	Medium
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Messaging seen by Communications team:	Yes	**Round Robin:**	No

Purpose of Report

The purpose of this paper is for you to:

Note the results of the 2018 National Monitoring Study of Student Achievement – Wānangatia Te Putanga Tauira (NMSSA) reports for mathematics and statistics, and for social studies, as well as the accompanying technical report.

Agree for us to release the reports on the Education Counts website.

Agree to proactively release this Education Report

Summary

The 2018 NMSSA programme assessed mathematics and statistics (hereafter referred to as 'maths'), and social studies.

There were significant increases in the proportions of students achieving at the expected level for Year 4 social studies and Year 8 maths since these learning areas were assessed in the first cycle (in 2014 and 2013, respectively).

Consistent with previous cycles, proportionally more Year 4 students than Year 8 students continue to achieve at their respective expected curriculum levels.

Table 1. Year 4 students are consistently more likely than Year 8 students to achieve at the expected curriculum level.

Learning area	2013		2014		2018	
	Year 4	*Year 8*	*Year 4*	*Year 8*	*Year 4*	*Year 8*
Maths	81%	41%			81%	45%
Social Studies			63%	36%	73%	37%

Mathematics and Statistics

By the end of Year 4, most students are expected to be achieving at (or above) curriculum Level 2. By the end of Year 8, most students are expected to be achieving at (or above) Level 4.

In 2018, 81% of Year 4 students achieved a score on the scale associated with achieving at curriculum Level 2, while 45% of Year 8 students achieved a score on the scale associated with achieving at curriculum Level 4.

The increase in proportion of Year 8 students achieving at least at curriculum Level 4 from 41% to 45% between 2013 and 2018 was associated with an increase in the average maths score for Year 8 students by three score points (114 to 117). There was no change in the average score or proportion of students achieving at least at Level 2 at Year 4.

There were significant increases in the average maths scores for the following subgroups:

- Year 4 boys
- Year 8 boys
- Year 8 girls
- Year 8 Pacific students
- Year 8 students attending low decile (1 to 3) schools.

Social studies

About a third of Year 8 (37%) and three quarters of Year 4 (73%) students achieved at or above the expected curriculum levels in social studies. The figure for Year 4 students rose from 63% in 2014. The figure for Year 8 students increased by 1%.

The proportion of Year 4 students achieving at or above curriculum Level 2, increased by 10 percentage points. There was no significant change for the proportion of Year 8 students achieving at curriculum Level 4.

The average social studies score for Year 4 students increased by four points (76 to 80) from 2014 to 2018. There was no statistical change at Year 8.

There were significant increases in the average social studies scores for the following subgroups:

- Year 4 girls
- Year 4 Māori students
- Year 4 Pacific students
- Year 4 Asian students
- Year 4 and Year 8 students attending low decile (1-3) schools.

Recommended Actions

The Ministry of Education recommends you:

a. **note** the findings from the NMSSA 2018 key findings reports (Mathematics and Statistics, and Social Studies).

Noted

b. **agree** to release the following reports on the Education Counts website:

- Mathematics and Statistics – Key Findings;
- Social Studies – Key Findings;
- Technical Information 2018 – Mathematics and Statistics, and Social Studies.

Agree / Disagree

c. **agree** to release flyers on the following areas in the Education Gazette in November 2019:

- Mathematics and Statistics;
- Social Studies.

Agree / Disagree

d. **agree** to forward the reports to Associate Ministers of Education Davis, Martin and Salesa.

Agree / Disagree

e. **agree** to proactively release this Education Report as per your expectation that information be released as soon as possible. Any information which may need to be withheld will be done so in line with the provisions of the Official Information Act 1982.

Agree / Disagree

f. **note** that we are working on a communications plan and will liaise with your office prior to the release date.

Noted

Dr Craig Jones
Deputy Secretary
Evidence, Data and Knowledge
30/10/2019

Hon Chris Hipkins
Minister of Education
21/11/19

Background

1. The National Monitoring Study of Student Achievement – Wānangatia Te Putanga Tauira (NMSSA) is a programme to assess and understand student achievement in English-medium settings across all learning areas of the New Zealand Curriculum (NZC) at Years 4 and 8.[1]

2. The main purposes of NMSSA are to:
   - Provide a snapshot of student achievement against the New Zealand Curriculum;
   - Identify factors that are associated with achievement;
   - Assess strengths and weaknesses across the curriculum;
   - Measure change in student achievement over time;
   - Provide high quality, robust information for policy makers, curriculum planners and educators.

3. NMSSA has a particular focus on Māori students, Pacific students and students with special education needs.

4. One hundred randomly-selected schools at each of Year 4 and Year 8 took part in the NMSSA assessments during term 3, 2018. Up to 25 students from each school were randomly selected to take part in the assessment. The achieved samples included about 2,000 students from each year level in mathematics and statistics (maths) and about 1,200 students at each year level in social studies. A subset of about 600 students at each year level took part in individual tasks and interviews, and about 800 students took part in group activity-based assessments.

5. Responses to questionnaires were received from 97 principals of Year 4 students and 85 principals of Year 8 students from the participating schools, as well as 240 teachers at Year 4 and 224 teachers at Year 8.

6. Each year, a panel of subject matter experts convenes to align student performance in the assessments to the levels of the NZC. See Annex 1 for a list of subjects included in cycle 1 and cycle 2 of NMSSA.

7. NMSSA measures the proportion of students achieving above the minimum scale score associated with achieving curriculum level objectives in the assessed learning areas. At the end of Year 4 most students are expected to be achieving curriculum Level 2 objectives, and at the end of Year 8 most students are expected to be achieving curriculum Level 4 objectives.

8. Because NMSSA takes place in term 3, more students are likely to reach the minimum associated with the expected curriculum level objectives by the end of the year.

[1] Note that NMSSA does not include independent or Māori-medium schools.

The 2018 NMSSA programme

9. In 2018, NMSSA assessed students in two learning areas: mathematics and statistics (hereafter referred to as maths) and social studies. NMSSA used a range of methods to assess student achievement, including one-on-one interviews, group assessment tasks and questionnaires.

10. Proportionally more Year 4 students than Year 8 students performed above the minimum scale score associated with achieving curriculum level objectives in both maths (81% Year 4 vs 45% Year 8) and social studies (73% Year 4 vs 37% Year 8) (see Tables 1 and 2).

11. The proportion of Pacific and Māori students at the expected levels are low compared to other groups particularly at Year 8, where only 20-27% are achieving at curriculum level 4 or above

Table 2. Percentage of students achieving at the expected rate in Social Studies and Maths, by year level and ethnic group

		Pacific	Māori	Asian	NZ European
Year 4 (at or above L2)	**Social Studies**	50%	59%	78%	81%
	Maths	59%	68%	91%	88%
Year 8 (at or above L4)	**Social Studies**	22%	20%	48%	42%
	Maths	24%	27%	62%	50%

Mathematics and Statistics

12. Mathematics and Statistics ('maths') is an important part of the curriculum with most students (75% at Year 4 and 68% at Year 8) spending three to five hours per week learning maths. Students were generally positive about learning maths, and most rated the difficulty of their maths learning as 'about right for me'. All teachers agreed that teaching maths is important and most enjoyed teaching maths and were confident teaching it.

Achievement for Year 8 students and some groups has improved slightly since 2013

Figure 1. Since the last cycle Year 8 achievement in mathematics and statistics has improved, while Year 4 has remained steady

13. There was no change in the average maths score for Year 4 students from 2013 to 2018. The average at Year 4 in 2013 was 83 score points and in 2018 it was 84 score points. However, there was a significant increase for boys' average achievement (from 82 to 85 score points).

14. There was a small increase (3 score points) in the average maths score for Year 8 students from 2013 to 2018. The average at Year 8 increased from 114 in 2013 to 117 score points in 2018. The percentage of students who achieved at the expected level in maths remained steady for Year 4 students, and rose by 4 percentage points at Year 8.

15. Students at Year 8 score higher than those at Year 4, and the difference between the two year groups' average scores can be used to estimate a measure of progress. The difference between the average scores was 33 points meaning that students make about 8 points progress on average each year in maths.

16. There were increases for some sub-groups of students over the last five years. There were small but significant increases in average scores (ranging from two to six score points) for Year 8 boys and girls, Year 8 Pacific students, and Year 8 low decile students' scores which were equivalent to one-quarter to three-quarters of a year's progress.

Inequity between groups of students remains

17. Although the scores of Year 8 students in low decile schools improved, there remains a persistent gap between students in low and high decile schools, the equivalent of about two years' progress (20 points at Year 4 and 18 points at Year 8). Year 8 students who attended secondary schools scored higher than those at full primary or intermediate schools (by 4 and 3 points respectively).[2] However, it must be noted that

[2] Secondary schools taking part in NMSSA cater for Year 7 to Year 15 students, while many secondary schools (which do not take part in NMSSA) cater to only Year 9 to 15 students.

nearly all of the secondary schools who took part were mid and high decile, while the other schools were more evenly distributed across decile bands.

18. Both Māori and Pacific students' average performance was weaker when compared with non-Māori and non-Pacific peers. Māori students at both year levels scored an average of 11 points lower than their non-Māori peers, while the average scores for Pacific students were 15 points lower at Year 4 and 13 points lower at Year 8. This is equivalent to more than a year behind their non-Māori and non-Pacific peers.

19. At both year levels, students with special education needs scored an average of 17 points lower than those without special needs, equivalent to two years' progress.

20. Boys scored higher than girls in maths, on average (by 3 points at Year 4 and 2 points at Year 8), and there was more variation in boys' scores. Maths is the only learning area of the NZC where boys score higher than girls in NMSSA.

How confident students are in maths correlates with how good they are

21. Most students were positive and confident about learning maths, with Year 4 students tending to be more positive and confident than Year 8 (by 7 or 8 points). Boys were typically more positive and more confident than girls. Both students' attitudes towards, and confidence in, maths were positively associated with achievement. Confidence was more closely correlated with achievement than attitudes. Those who were confident in maths were more likely to achieve higher scores. The difference between boys' and girls' level of confidence was greater at Year 8 while the relationship between students' confidence and their maths achievement, and attitudes and achievement was stronger at Year 8 than Year 4.

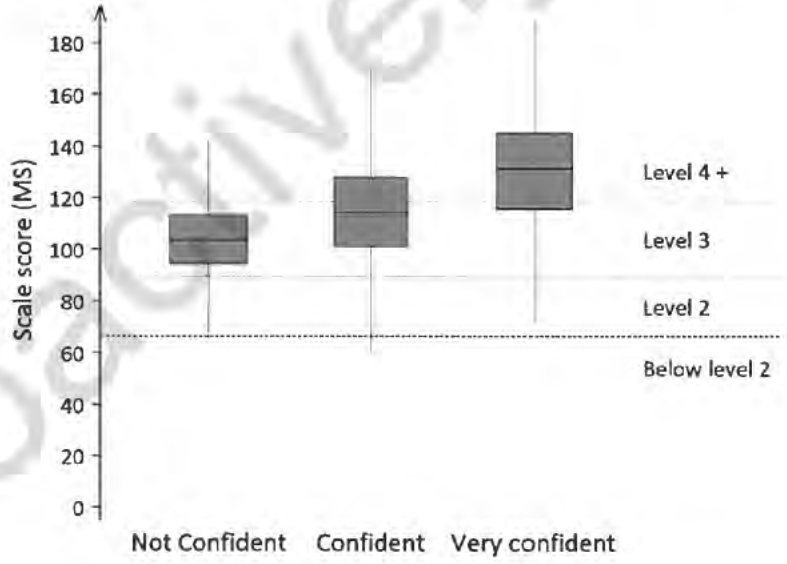

Figure 2. Confidence and achievement are related for Year 8 students in maths

22. Around one in six students said that they never talked to their teacher about how they are doing or about their next learning steps in maths, but most students rated the learning they did in maths as 'about right for me' (80% of Year 4 and 72% of Year 8). Of the remaining students, more said their maths was 'too easy' than 'too hard'.

There are frequent opportunities for students to learn in maths

23. Overall, students and teachers consistently said that students took part in most learning opportunities relatively frequently, including working with other students to solve maths problems, and explaining their way of solving a maths problem. However, around one-third of students at both year levels said that they never wrote maths problems for other students to solve or used a calculator to help them solve a problem (this number was over half for Year 4 students). Teacher reporting indicated differences in learning opportunities, with 70% of Year 4 teachers at low decile schools reporting that their students 'never or almost never' used calculators, compared with 45 percent of teachers at high decile schools. Students at high decile schools were also more likely to use digital devices to learn or practise maths. Teachers at both mid and high decile schools were less likely to report that their students wrote maths problems for their peers to solve.

24. The majority of teachers were confident in teaching maths and enjoyed teaching maths, with Year 8 teachers being more confident than Year 4 teachers. Teachers taught their students maths for 3 to 5 hours per week, on average. They regularly used ability grouping, but rarely used social or interest grouping. Two-thirds of teachers had participated in professional learning and development associated with maths in the last two years. This is down from 80% in 2013. Teachers unanimously agreed that they knew which level of the curriculum their students were at and almost all agreed that they could confidently assess students' progress and achievement in maths.

25. Principals were positive about their school's ability to teach maths, with over 80% of principals rating their school's provision for learning maths as 'good' or 'very good'. These rates were higher at high decile schools than low decile schools. About two-thirds of schools were in a Kāhui Ako, and half of these had achievement challenges that focused on maths for Year 4 and/or Year 8 students.

Social Studies

26. The 2018 social studies assessment differed in format from the 2014 assessment. However, the two studies were able to be linked using a number of common items across the two years to ensure differences in achievement can be measured.

Year 4 scores improved, and the proportion achieving increased

Figure 3. Since the last cycle Year 4 achievement in social studies has improved, while Year 8 achievement has remained stable

27. Almost twice the proportion of students achieved at the expected curriculum level at Year 4 (73% at Level 2), than Year 8 (37% at Level 4). The proportion of Year 4 students achieving at the expected level increased by 10 percentage points from 2014 to 2018, from 63 percent to 73 percent of students. The average score for Year 4 students also increased, by 4 points. Similar proportions of Year 8 students achieved at the expected curriculum level in both 2014 (36%) and 2018 (37%).

28. Year 8 students scored an average of 39 points higher than Year 4 students. This difference across the four years is used to estimate annual progress between Year 4 and Year 8. That is, students make about 10 points 'progress' each year in social studies.

29. At Year 4, the average social studies scores increased significantly from 2014 to 2018 for girls, Māori students, Pacific students, Asian students and students at attending low decile schools. These increases were the equivalent of from about half a year's progress, to more than a year of progress and were larger increases than were seen in maths. At Year 8, the only significant increase was for students attending low decile schools.

Inequity still exists

30. Girls scored higher than boys, on average, by the equivalent of nearly half a year's progress at Year 4. This gap widens to the equivalent of almost a full year of progress by Year 8. The difference between girls and boys was also seen across ethnic groups, with Māori girls typically outperforming Māori boys by a year's progress (11 points) at Year 8, and Pacific girls outperforming Pacific boys at Year 4 by 7 points.

31. Māori and Pacific students scored lower than non-Māori and non-Pacific students, on average, by the equivalent of about a years' progress, at both year levels.

32. Students with special education needs tended to have weaker performance than students without special education needs. Scores differed by about 17 points, on average, or close to two years' progress, at both year levels.

33. Students from high decile schools achieved higher scores on average than those at low decile schools, equivalent to almost two years' progress.

Students like learning social studies

34. Students were both positive and confident about learning social studies, with Year 4 students being more positive and confident, on average, than Year 8 students (both by 7 points). Scores on attitudes to, and confidence in, social studies were positively, but weakly, associated with achievement. That is, students who had higher achievement tended to also be more positive about learning social studies. The relationship between students' confidence and achievement was stronger than the relationship between their attitudes and achievement.

35. The majority of students used each element of the social inquiry approach[3] 'often' or 'very often'. For example, more than half of students at both year levels said that they 'often' or 'very often' asked questions and got information about topics or themes, and thought about their values and other people's values. Most students reported that they were involved in a range of learning experiences in social studies, and more than 80 percent rated the difficulty of their social studies learning as 'about right for me'. However, only around a third of students reported that they were given feedback 'often' or 'very often' from their teacher on how well they were doing.

Most teachers are confident teaching social studies, but a significant minority are not

36. Almost all teachers were positive about teaching social studies and most were confident teaching it, however around 20 percent disagreed or strongly disagreed that they were generally satisfied with how they teach social studies. Also, between 10 and 20 percent of teachers at both year levels disagreed that they could provide an effective and inclusive programme for students who needed learning support, had the necessary knowledge and skills to teach all students, and could plan social studies lessons to match students' individual needs.

37. Year 8 teachers were more likely than Year 4 teachers to report using elements of the social inquiry approach often or very often. Compared with 2014, Year 4 teachers were less confident at having the skills to teach to a diverse range of students. About three-quarters of teachers accessed Te Kete Ipurangi (TKI) social studies online to support their teaching of social studies.

38. Most teachers reported that students often or very often experienced a range of learning opportunities in social studies. The learning opportunities asked about included participating and contributing in groups, connecting learning to student's families, whanau and community, and student participation in social action on issues of

[3] The social inquiry approach is an integrated process for examining social issues, ideas and themes. Using a social inquiry approach, students: ask questions, gather information and background ideas, and examine relevant current issues; explore and analyse people's values and perspectives; consider the ways in which people make decisions and participate in social action; reflect on and evaluate the understandings they have developed and the responses that may be required (The New Zealand Curriculum, page 30)

interest. Teachers tended to report that students experienced learning opportunities more often than the students themselves reported. Half the teachers had received professional learning and development in social studies within the last five years, while only a third rated the professional support they received as either 'good' or 'very good', with most rating it as fair or poor. Two-thirds of Year 4 principals and half of Year 8 principals reported that teachers had no or little access to professional learning and development in social studies.

Most principals say that social studies is not a focus

39. Most principals were confident that their school had a clear plan for social studies implementation, and assessment strategies for student progress, but fewer had goals related to student learning in social studies or processes for analysing student achievement information to inform curriculum review and resourcing decisions. Social studies had not been a focus for development in the last five years for more than half of the schools, and had been a major focus in fewer than ten percent of schools. Year 8 principals rated their school's provision for students' learning in social studies higher than Year 4 principals.

Proactive Release

40. It is intended that this Education Report is proactively released as per your expectation that information be released as soon as possible. Any information which may need to be withheld will be done so in line with the provisions of the Official Information Act 1982.

Annex 1: Subjects included in Cycle 1 and Cycle 2 of NMSSA

Cycle 1 of the NMSSA programme

1. NMSSA is an assessment programme that will develop and evolve over time. During the first cycle (2012 – 2016), the data collected provides the baseline for measuring change in student achievement over subsequent cycles, as well as the opportunity to monitor trends over time.
2. Cycle 2 of the NMSSA assessment programme commenced in term 3, 2017 with science and health and physical education being assessed for a second time. The five-year programme for Cycle 2 is outlined below.

Assessment Year	Learning areas	Year 4 students who achieved above the minimum associated with achieving curriculum level 2 objectives	Year 8 students who achieved above the minimum associated with achieving curriculum level 4 objectives
2017	Science	94%	20%
	Health and Physical Education	88%	33%
2018	Mathematics and Statistics	81%	45%
	Social Studies	73%	37%
2019	English		
2020	The Arts		
	Learning Languages		
2021	Technology		

3. The learning areas assessed over the first five-year NMSSA cycle are detailed below.

Assessment Year	Learning areas	Year 4 students who achieved above the minimum associated with achieving curriculum level 2 objectives	Year 8 students who achieved above the minimum associated with achieving curriculum level 4 objectives
2012	Science	85%	19%
	English: writing	65%	35%
2013	Mathematics and Statistics	81%	41%
	Health and Physical Education	97%	51%
2014	English: reading	58%	59%
	Social Studies	63%	38%
2015	The Arts	72%	63%
	English: listening	79%	70%
	English: viewing	77%	63%
2016	Technology	73%	53%
	Learning Languages[4]	NA	NA

[4] The learning languages programme involved three components. The first two components focussed on a range of contextual and attitudinal information about the learning languages area from students, teachers and principals using questionnaires. The third component assessed students' knowledge and understanding of te reo Māori words and phrases.

Annexes

Annex 1:	Subjects included in Cycle 1 and Cycle 2 of NMSSA
Annex 2:	Mathematics and Statistics 2018 – Key Findings
Annex 3:	Social Studies 2018 – Key Findings
Annex 4:	Technical Report 2018
Annex 5:	Education Gazette flyers: Science and Health & Physical Education
Annex 6:	Communications Plan – Science and Health & Physical Education

NMSSA • CYCLE 2

Wānangatia te Putanga Tauira
National Monitoring Study of Student Achievement

Mathematics and Statistics 2018 – Key Findings

NMSSA Report 19: MATHEMATICS & STATISTICS 2018 – KEY FINDINGS

NMSSA
Wānangatia te Putanga Tauira
National Monitoring Study of Student Achievement

CYCLE 2
NMSSA Report 19

Wānangatia te Putanga Tauira

National Monitoring Study of Student Achievement

Mathematics and Statistics 2018

Key Findings

Educational Assessment Rese rch Unit
and
New Zealand Council for Educational Research

NMSSA Report 19

Key reports for Mathematics and Statistics 2018
(all available online at http://nmssa.otago.ac.nz/reports/index.htm)

19: Mathematics and Statistics 2018 – Key Findings
21: Technical Information 2018

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- members of the curriculum advisory panel and reference groups for mathematics and statistics
- principals, teachers and students of the schools where the tasks were piloted and trials were conducted
- principals, teachers and Board of Trustees' members of the schools that participated in the 2018 main study including the linking study
- the students who participated in the assessments and their parents, whānau and car givers
- the teachers who administered the assessments to the students
- the teachers and senior initial teacher education students who undert ok the marking
- the Ministry of Education Research Team and Steering Committ

Executive Summary

Introduction

The National Monitoring Study of Student Achievement (NMSSA) is designed to assess student achievement across the New Zealand Curriculum (NZC) at Year 4 and Year 8 in English-medium state and state-integrated schools. The study is organised in five–year cycles. The first cycle ran from 2012 to 2016

In 2018, NMSSA assessed achievement in the mathematics and statistics learning area using a nati nally representative sample of about 2,000 students at each of Year 4 and Year 8. A two-stage sampling de ign was used to construct each sample. In the first stage, a stratified random sampling approach hat took into account school decile, geographical region and school size was used to select 100 schools a each year level. In the second stage, a maximum of 25 students were randomly selected from each sc l to take part in the study[1].

Results were reported on a measurement scale called the Mathematics and Sta istics (MS) scale. The scale was designed so that the combined average for Year 4 and Year 8 was 10 MS cale score units and the average standard deviation for the two year levels was 20 MS cale core un ts. Questionnaires were also used to gather contextual information from students, teach rs and rincipal .

The mathematics and statistics learning area was last ass s ed by NMSSA in 2013. The measurement scales used in 2013 and 2018 were linked based on assessmen tasks that were administered at both points of time. This allowed results from the separate studies to be compared. The linking process involved reconstructing the 2013 achievement distributions using the plausible values approach employed in 2018. This means that achievement statistics prese ted in th s report vary from the statistics presented in the original 2013 report.

This report is designed to provide a succin t ov rview of key findings from the 2018 mathematics study. It is supplemented by a report focused on urri ulum insights for teachers, a technical report and an online interactive statistical appl catio All eports and the interactive application can be found on the NMSSA website (www.nmssa.org.nz)

Throughout the report, the rm 'mathematics and statistics' has usually been shortened to 'mathematics' to support readability This in n way lessens the importance of statistics as part of the mathematics and statistics learning a a.

Key findings

Change in achievement between 2013 and 2018

Averag chievement in mathematics and statistics for all students at Year 8 increased between 2013 and 2018 by 3 MS units. The increase was statistically significant. At Year 4, the average increased a non-significant 1 unit over the same period. Statistically significant increases in average achievement scores between 2013 and 2018 were noted for several population subgroups, including: Year 4 boys, Year 8 boys, Year 8 girls, Year 8 Pacific students and Year 8 students in low decile schools. These increases ranged from 2 (Year 8 boys) to 6 MS units (Year 8 Pacific students).

[1] Detailed information about the sampling process and the achieved sample can be found in *NMSSA Report 21 Technical Information 2018*.

[2] The curriculum insights and technical reports should be available early in 2020.

Achievement in mathematics and statistics in 2018

Most students (81 percent) in Year 4 achieved at or above curriculum expectations (curriculum level 2), while in Year 8, 45 percent achieved at or above curriculum expectations (curriculum level 4).

The difference in average scores between Year 4 and Year 8 indicates that, on average, student achievement increased by 8 MS units per year between Year 4 and Year 8. As indicated above, this rate of 'progress' was not enough to maintain the same level of achievement against the curriculum at Year 8 as recorded at Year 4.

There were high and low achievers in all population subgroups. There were also some statistically significant differences between the average scores recorded for different groups.

Boys scored higher, on average, than girls by 3 MS scale score units at Year 4 and 2 units at Year 8.

At both year levels, students from high decile schools scored higher, on average, than those f om mid decile schools, who, in turn, scored higher than those from low decile schools. The difference betw en the average scores for students in the high and low decile bands was 20 MS units at Year 4 and 18 MS units at Year 8.

Scores for Māori students were lower, on average, than non-Māori by 11 MS uni at oth year levels. Pacific students scored lower, on average, than non-Pacific by 15 MS units at ear 4 a d 13 MS units at Year 8. Asian students scored higher, on average, than non-Asian students (by 9 MS uni s at Year 4 and 11 MS units at Year 8).

Contextual findings in 2018

From students

Most students were 'positive' or 'very positive' about l a ning mathematics at school and expressed confidence as mathematics learners. Students in Year 8 tende to be less positive about mathematics and, overall, expressed lower levels of confidence in ma hematics than students in Year 4. On average, boys indicated a higher level of confidence in mathematics than girls.

Students' scores on measures of their attitude to ma hematics and confidence in mathematics were positively associated with their achiev ment sco es. O erall, the relationship between confidence and achievement was stronger than the elat ons ip between attitude and achievement. The relationship between confidence and achievemen was stro ger for Year 8 students than for Year 4 students.

Students indicated frequent involv ment in a range of learning opportunities associated with mathematics. One exception to this wa th opportunity to use a calculator to solve problems. Over half the Year 4 students and about a quarte of Y ar 8 students reported they 'never or almost never' used a calculator to solve problems.

Most students ted t e dif iculty of their mathematics learning as 'about right for me'.

From teachers

About a uar r of the teachers who responded to the teacher questionnaire indicated that they had synd cate, school, or Community of Learning/Kāhui Ako leadership responsibilities for mathematics. Year 8 teac ers were more likely to indicate that they had a specialist focus in their initial teacher education or h d an undergraduate or graduate qualification related to mathematics (23 percent compared with 8 perc nt, respectively).

All teachers agreed that teaching mathematics is important and most indicated that they enjoy teaching mathematics. Most teachers reported that they were confident about teaching it. At both year levels, teachers indicated they were most confident teaching number and least confident teaching algebra. Year 8 teachers expressed greater confidence than Year 4 teachers in teaching all sub-strands of the mathematics and statistics learning area.

All teachers agreed they know at which level of the NZC each of their students is achieving in mathematics. The majority of teachers indicated their students spent 3 to 5 hours per week, on average, learning mathematics.

Ability group-based activities were used regularly as an organisational strategy for teaching mathematics.

Overall, the majority of teachers indicated that they had adequate access to a range of resources for teaching mathematics.

Around two thirds of teachers at Year 4 and Year 8 reported that they had participated in professional learning and development (PLD) associated with mathematics in the last two years.

In general, teachers reported regular opportunities to take part in a range of professional interactions with colleagues related to teaching mathematics. Around a third of teachers indicated they 'never' or 'almost never' observe a colleague teaching mathematics.

From principals

Over 80 percent of principals rated the provision for learning mathematics in their school as 'good' or ry good'.

Most principals were positive about their school's curriculum planning, assessment nd sharing of information related to mathematics. They were also positive about the capabilities of teachers in the mathematics and statistics learning area.

Principals indicated that nearly all mathematics programmes were deliv red e tirely o primarily by the classroom teacher.

About two thirds of principals reported that their school was part of a Kāhu Ako Community of Learning. Half of the principals who identified their school was part of a Kāhui Ak indi ated that the Kāhui Ako had achievement challenges for mathematics that involved Yea 4 and or Yea 8 tudents.

Most principals indicated that teachers had moderate to ext nsi e access to external PLD in mathematics.

Around 90 percent of principals reported that the mathematics nd statistics learning area had been a focus for development in the last five years.

Changes in contextual findings between 2013 to 2018

Broadly speaking, students, teachers and pr ncipals in 2 13 and 2018 responded similarly to contextual questions that were used at both year l vel . In ome cases, changes to wording or response formats made direct comparison difficult. One diff renc related to involvement in professional learning and development stood out. In 2013, abou 80 percent of all teachers reported that they had participated in PLD in mathematics teaching less han 2 ye s ago. This compared with about two thirds of teachers in 2018.

1 Introduction to the National Monitoring Study of Student Achievement

This chapter provides a broad overview of the purpose and features of the National Monitoring Study of Student Achievement (NMSSA), introduces the focus of the study for 2018 and outlines the structure of the mathematics and statistics report.

Throughout the report, the term 'mathematics and statistics' has usually been shortened to 'math matics to support readability.

1. National Monitoring in brief: purpose and features

NMSSA is designed to assess student achievement at Year 4 and Year 8 in New Zeal nd E glish-medium state and state-integrated schools. The main purposes of NMSSA are to:

- provide a snapshot of student achievement against the *New Zealand Curriculum (NZC)*[3]
- identify factors that are associated with achievement
- assess strengths and weaknesses across the curriculum
- measure change in student achievement over tim
- provide high-quality, robust information for policy m kers, curriculum planners and educators.

The study is carried out over five-year cycles. The re ults from the first cycle (2012–2016) set the baseline for measuring change in student achievement over time in subsequent cycles. The second cycle, which began in 2017, provides the first opportunity t comp re learning outcomes over time.

NMSSA designs and carries out studie in up t two l arning areas each year. The study includes an assessment of student performance and the ollection of contextual information from students, teachers and principals to help us understand the fact rs as ociated with students' achievement. In relation to specific learning areas, the conte tual inform tion includes: students' attitudes, confidence and opportunities to learn; teachers' confidence in teaching he specific learning area and the learning experiences provided for students; and teachers' nd prin ipals' views of the professional and curriculum support provided by the school for the learning rea.

Advisory panels of urricul m experts[4] and a technical reference group provide support for the project.

2. The focus of the NMSSA study for 2018

The ocus f r the 2018 NMSSA study was the mathematics and statistics, and social studies[5] learning areas. Mathematics was previously assessed in 2013; social studies in 2014. In mathematics, nationally epresentative samples[6] of about 2,000 students from 100 schools at each of Year 4 and Year 8 took part in group-administered assessment. A subset of about 600 students at each year level took part in individual or group activity-based assessments and interviews.

A two-stage sampling design was used to construct each sample. In the first stage, a stratified random sampling approach that took into account school decile, geographical region and school size was used to

[3] Ministry of Education (2007) *The New Zealand Curriculum*. Wellington: Learning Media.

[4] The mathematics advisory panel comprised discipline experts, advisors, teacher educators and researchers as well as classroom teachers and representatives of the Ministry of Education.

[5] The findings for social studies can be found in *NMSSA Report 20 Social Studies 2018 – Key Findings.*

[6] Information about the sampling process and the achieved samples can be found in Appendix 1 of *NMSSA Report 21 Technical Information 2018.*

select 100 schools at each year level. In the second stage, a maximum of 25 students were randomly selected from each school to take part in the study[7].

Experienced, specially trained teacher assessors conducted the assessments during Term 3 (July to September 2018).

3. Structure of the mathematics report

This report is designed to provide a succinct overview of the 2018 NMSSA mathematics study. The report is set out in four chapters.

- This chapter, Chapter 1, provides an overview of the 2018 NMSSA programme.
- Chapter 2 briefly describes the 2018 mathematics programme, including information about the achievement measures and the contextual questionnaires.
- Chapter 3 presents the findings related to achievement in mathematics and reports these agains the levels of the mathematics learning area of the NZC. It also reports on changes in ach e ment observed between 2013 and 2018.
- Chapter 4 looks at contextual factors related to teaching and learning in math matics using questionnaire data collected from students, teachers and principals.

An appendix to the report contains statistical information related to the achi vement measures.

4. Further information

This report is supplemented by two other reports and an on ine interactive statistical application.

The report *Mathematics 2018 Insights* provides in-depth information for teachers and schools about the 2018 mathematics assessment including annotated examples of questions and tasks used in the assessment.

The report *Technical Information 2018* ontain b ckground and technical information, including information about the characteristics of the samples of s udents, teachers and principals from whom data were collected, the conceptualisation and devel pme t of the mathematics assessment programme, construction of the measurement sca e procedures for linking data from 2013 and 2018 and the methodology of the study.

The online interactive application ll ws users to generate tables and graphs using achievement and contextual data generated by the 2018 study.

All reports and the interactive application can be found on the NMSSA website (www.nmssa.otago.ac.nz). Note the report *Ma hematic 2018 Insights* will be made available on the website after the other reports.

[7] Detailed information about the sampling process and the achieved sample can be found in *NMSSA Report 21 Technical Information 2018*.

2 2018 NMSSA Mathematics Study

This chapter provides an overview of the 2018 NMSSA mathematics study. It includes three parts.

- Part 1 briefly describes the mathematics learning area of the *New Zealand Curriculum (NZC)*[8].
- Part 2 outlines what has been learned from previous studies of achievement in mathematics.
- Part 3 describes the components of the 2018 NMSSA mathematics study.

1. Mathematics and the New Zealand Curriculum

The NZC describes mathematics as exploring and using patterns and relationships in q antitie space and time. Statistics is described as the exploration and use of patterns and relationships in da a. According to the NZC, mathematics and statistics: "…equip students with effective means for inve tigating, interpreting, explaining and making sense of the world in which they live"[9].

The NZC provides achievement objectives for the mathematics and stati i s lea ning area in three strands: number and algebra; geometry and measurement; and statistics. Th objectives are organised into eight levels. The ideas covered by the objectives are expected to be prese ted in meaningful contexts where students think mathematically and statistically to solve problem and model solutions. Students are also expected to make connections between the strands.

2. Previous studies of achievement in mathematics

The 2013 NMSSA assessment of mathematic

NMSSA last assessed the mathematics and tatis ics lea ning area in 2013. Two achievement measures were used. The first was based on a group-administered assessment made up of a mixture of selected response and short constructed response uestions. The second involved a collection of more open-ended tasks, most of which were administer d as part of one-to-one interviews with students. Results from the study indicated that about 41 percent of students from Year 8 were meeting or exceeding curriculum expectations (curriculum l vel 4) This compared with about 81 percent of students in Year 4 (curriculum level 2).

Other system-wide assessments in New Zealand

NMSSA's udy of mathematics complements two international studies of achievement in mathematics: the Trends in International Mathematics and Science Study (TIMSS) and the Programme for International Student Ass ssment (PISA). Both studies involve the assessment of nationally representative samples[10].

The In rn tional Association for the Evaluation of Educational Achievement's (IEA) TIMSS programme is focused on students in Year 5 and Year 9, and assessments are administered in a four-year cycle. The first cycle was held in New Zealand in 1994 and the most recently completed cycle took place in 2014. The current cycle took place for Year 5 in 2018, and for Year 9 in 2019.

The average score for Year 5 students on the TIMSS assessment steadily increased from 1994 to 2002. However, from 2002 to 2011, the average score decreased. In 2014, the average score was not statistically

[8] Ministry of Education. (2007). *The New Zealand Curriculum.* Wellington: Learning Media.

[9] The New Zealand Curriculum, p.26.

[10] The TIMSS and PISA assessment frameworks differ from each other. TIMSS focuses on curriculum learning while PISA is more focused on the extent to which students have developed the capacity to formulate, employ and interpret mathematics in a variety of life contexts.

significantly different from the average scores recorded in 2002, 2006 and 2011[11]. At Year 9, there has been no statistically significant change in average achievement since the first cycle in 1994[12].

The PISA project, which started in 2000, is an initiative of the Organisation for Economic Co-operation and Development (OECD). PISA looks at the mathematical, reading and scientific literacy of 15-year-old students, and is undertaken on a three-yearly cycle. The average mathematics literacy score has steadily fallen from an average of 523 points in 2003 to 495 in 2015. Most of the decline occurred between 2009 and 2012[13].

In general, in comparison to other countries the international studies indicate that New Zealand does relatively well internationally at a secondary level, but not so well at primary.

3. The 2018 NMSSA mathematics study

An advisory panel of mathematics curriculum experts met with the NMSSA project team in 2017 to consider the shape of the 2018 NMSSA mathematics study. The NMSSA team drew n the panel discussion and the 2013 NMSSA mathematics study to develop an assessment framework[14] and programme for the 2018 study. The components of the 2018 mathematics study are outlined in Tab 2.

Table 2.1 Components of the 2018 NMSSA mathematics programme

Component	Focus	Asessment ppr ach a d achieved sample
Assessments		
1. The Mathematics and Statistics (MS) assessment	• Understanding and using the ideas and processes described by the achievement objectives across the three content strands of the mathematics and statistics learning area wi hin the NZC (number and alge ra, geometry and measuremen and statistics).	• A wo-par sessment incorporating: 45 minute group-administered paper-and-pencil assessment completed by 2,105 students at Year 4 and 1,985 students at Year 8. o a series of 'in-depth' tasks, most of which were administered in one-to-one student interviews and were completed by about 600 students (up to 6 in each school) at each of Year 4 and Year 8.
Contextual information		
2. Student questionnaire	• Attitu es t mathematics and confide ce in thematics • Opportu ities to learn mathem cs at school.	• A computerised questionnaire completed by 1150 students at Year 4 and 1162 at Year 8.
3. Teacher and principal questionnaires	• Tea her and principal views of mathematics instruction in their school • Teacher confidence as mathematics educators • Opportunities for student learning in mathematics • Provision for teaching mathematics, including resourcing and opportunities for professional learning and development in mathematics.	• Separate teacher and principal questionnaires (paper-based and online options), completed by 240 teachers and 97 principals at Year 4, and 224 teachers and 85 principals at Year 8.

[11] Caygill, R., Singh, S., & Hanlar, V. (2016). Mathematis Year 5: Trends over 20 Years in TIMSS. Findings from TIMSS 2014/15. Wellington: Ministry of Education. (p.14.). Retrieved from: https://www educationcounts.govt.nz/publications/series/2571/timss-201415/timss-2015-new-zealand-year-5-maths-results

[12] Caygill, R., Hanlar, V. & Singh, S. (2016). Mathematics Year 9: Trends over 20 Years in TIMSS. Findings from TIMSS 2014/15. Wellington: Ministry of Education. (p.14.). Retrieved from: https://www.educationcounts.govt.nz/publications/series/2571/timss-201415/timss-2015-new-zealand-year-9-maths-results

[13] May, S., with Flockton, J , & Kirkham, S. (2016). PISA 2015 New Zealand summary report: How has mathematics performance changed over time? Wellington: Ministry of Education. Retrieved from: https://www educationcounts.govt.nz/publications/series/2543/pisa-2015/pisa-2015-summary-report

[14] See Appendix 2 (p.14), *NMSSA Report 21 Technical Information 2018.*

Component 1: Achievement in mathematics

The first component of the 2018 mathematics programme assessed achievement in mathematics using a two-part assessment called the Mathematics and Statistics (MS) assessment. The first part, which was completed by all students in the study (2,105 at Year 4 and 1,985 at Year 8), involved a group-administered paper-and-pencil assessment[15]. The second part involved a number of 'in-depth' tasks, which were completed by a sample of the students who took part in the group-administered assessment (up to six students in each school). As well as making use of the majority of tasks developed for the 2013 study, a range of new tasks was written for the 2018 MS assessment.

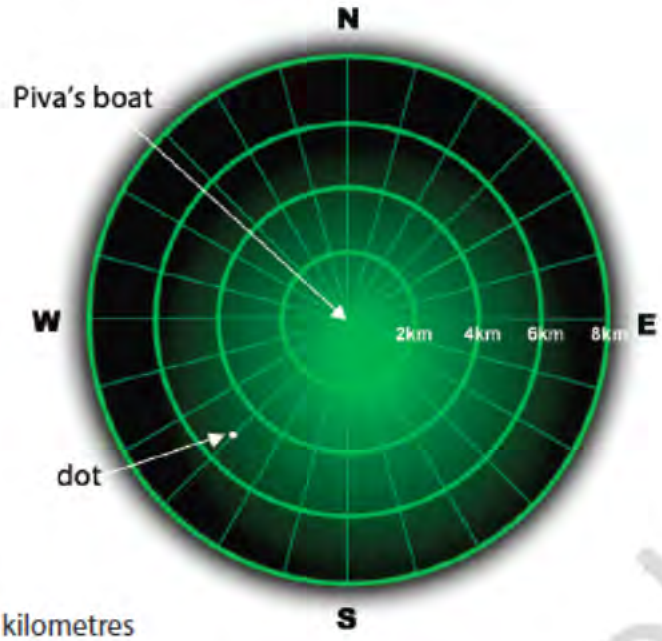
The group-administered assessment was made up of a mixture of selected response and short constructed response questions. Students completed one of 26 assessment forms which were carefully linked together through the use of common items.

Examples of questions and tasks from the MS assessment

Two of the questions developed for the group-administered part of the MS assessment are h wn in Figures 2.1 and 2.2. The question shown in Figure 2.1 is an example of a selected-response question administered to students in Year 8. The question involves interpreting a scale diagram and using compas directions.

[15] Within the NMSSA project, group administered assessments are sometimes referred to as GATs.

Piva sees a dot on his boat's radar screen.



NOTE: km = kilometres

I) What is the *distance* of the dot from Piva's boat?

A. 4 kilometres
B. 4.5 kilometres
C. 5 kilometres
D. 6 kilometres
E. 6.5 kilometres

II) What is the *compass direction* of the dot from Piva's boat?

A. North-west
B. South-west
C. North-east
D. South-east

Figure 2.1 An amp of se ected-response questions from the group-adminstered part of the Mathematics and Statist (MS) assessment administered at Year 8

Figure 2.2 shows a short constructed-response question administered to students as part of the group-administered assessment in Year 4. The question involves finding a fractional amount of a quantity.

Sanjay had 12 soft toys. He gave $\frac{1}{3}$ of them to a toy library.

How many soft toys did he give to the toy library? _____

M0404

Figure 2.2 An example of a short constructed-response question from the group-admini ered part of the Mathematics and Statistics (MS) assessment administered at Year 4

Figure 2.3 shows an example of a task that was used in the in-de th par f the MS assessment at Year 8. Called *Percentages*, the task was administered in a vide -rec rded, ne-to-one interview with a teacher assessor. The figure shows the task instructions, questions an the scoring approach.

Task: Percentages

Percentages Card 1

A shop has a "Buy one get the second one at half price" sale

If you choose 2 items that are the same price, what percentage of the total cost will you save altogether?

Percentages Card 2

This T-shirt is in a 25% off sale.

The sale price is $30.

What did it cost **before** it was put in the sale?

Percentages Card 3

This cereal is 10% fruit.

The company plans to increase the amount of fruit **by** 50%.

What percentage of the cereal will then be fruit?

Instr ctions to student:

tuden s wer given three percentage problems presented one by one on separate cards. For each card, they were told hat they could write or draw anything they needed to help solve the problem.

Students were asked to explain their approach to the problem. They were encouraged to explain any notes or drawings they ad created as part of solving the problem.

Scoring

Students were scored using a partial credit approach. Students who were given full credit provided explanations that demonstrated a strong understandings of the multiplicative relationships involved in each problem.

Figure 2.3 An example of an interview task from the in-depth part of the Mathematics and Statistics (MS) assessment administered at Year 8

Spread of tasks

Table 2.2 shows the spread of tasks developed for the 2018 study. The tasks have been categorised either according to the strand of the mathematics and statistics learning area they were designed to represent or as a task focused primarily on mathematical competencies. Three of the later tasks did not contribute to the MS scale and are reported on descriptively as part of the Insights Report for teachers.

Table 2.2 Coverage of tasks across strands and competencies in the mathematics and statistics learning area of NZC

Domain	Aspect	Year 4		Year 8	
		Group administered	In-depth	Group administered	In-depth
Number	Number knowledge	9	10	11	13
	Number strategies	24	3	26	3
Algebra	Patterns and relationships	6	1	5	1
	Equations and expressions	4	-	8	1
Measurement	Measurement	11	-	11	-
Geometry	Shape	6		5	
	Position and orientation	3	3	4	
	Transformation	2	-	5	-
Statistics	Statistical investigation	5	-	0	-
	Statistical literacy	2	-	-	-
	Probability	3	-	3	-
Mathematical competencies	Problem-solving, reasoning, communicating	-	4	-	4

Reporting achievement on the MS assessment

An analysis approach based on Item Response Theory (IRT)[1] was used to construct a single measurement scale for the MS assessment that allowed achievement at Year 4 and Year 8 to be reported using the same metric. The approach included generating plausible values to estimate achievement distributions for the population[17]. The techniques used to constr ct the scal were similar to those used in studies such as PISA and TIMSS[18].

For ease of understanding, the MS scale was anda dised o that:

- the average for all students (Ye r 4 and Year 8 combined) was equal to 100 MS scale score units
- the average standard deviation for the two year levels was equal to 20 MS scale score units.

In order to compare results f om 2013 with those from 2018, the scale developed to report achievement on the 2013 group-administ ed ass ssment was linked to the 2018 MS scale by comparing the scale locations of the common questi s us d in both assessments. The linking process involved reconstructing the 2013 achievement distributions sing the plausible values approach employed in 2018. This means that 2013 achievement st tistic used in this report vary from the statistics presented in the original 2013 report.

The MS sca e d scr tion

Figure 2 4 pro ide a description of the mathematics knowledge and skills measured by the MS scale. The desc iptors provide examples of the kinds of skills that students, who achieved at different parts of the cale, were typically able to display[19]. The descriptors are organised according to the content strands of the mathematics and statistics learning area.

[16] IRT was used to construct measurements of cognitive abilities and attitudes. IRT uses a mathematical model to describe the relationship between people (in terms of their levels of ability or the strengths of their attitude) and the probability of answering an item correctly or indicating a particular level of response to items. IRT uses flexible techniques for linking assessments made up of different questions to a common reporting scale. The common scale allows the performance of students to be compared regardless of which questions they answered. IRT was also used to construct the Attitudes to Mathematics and Confidence in Mathematics scales. This is developed further in Appendix 2 of *NMSSA Report 21 Technical Information 2018*.

[17] See Appendix 2 of *NMSSA Report 21 Technical Information 2018* for information about the generation of plausible values.

[18] The TIMSS and PISA studies are described earlier in this chapter.

[19] The descriptors located at each part of the scale were generated by examining the kinds of questions that students with achievement levels located at the same parts of the scale were able to answer successfully about 70 percent of the time.

2018 NMSSA • Mathematics and Statistics scale descriptors

Scale score

	NUMBER AND ALGEBRA	MEASUREMENT AND GEOMETRY	STATISTICS
180			
170	Describe and apply efficient strategies to solve word problems.		
160	Solve division problems with 2-digit divisors • Find an unknown in an equation involving order of operations • Solve a subtraction involving mixed length decimals • Find a percentage of a 3-digit number • Use proportional thinking to solve percentage problems • Find fractions of a fraction • Add and subtract fractions • Simplify an improper fraction • Write an algebraic expression to represent the nth term in a pattern.		
150		Interpret a quadrilateral classification system • Explain how to convert between grams and kilograms.	Recog is and m ke statements about the istribu n of g aphs • Interpret a 2 by 2 fre uency table • Create a pie chart from given data.
140	Plan, describe, and apply a strategy to solve word problems • Solve division problems with single-digit divisors • Find the square root of a whole number • Understand the order of operations • Add and multiply numbers involving one decimal place • Convert 3-digit decimals to percentages • Use proportional thinking to solve percentage problems • Find fractions of amounts • Order non-unit fractions • Recognise equivalent fractions such as 12/16 • Add and subtract simple fractions • Continue non-linear number patterns • Complete spatial number patterns.	Show a flexible understan ng of p imeter, rea and volume • Identify d ection and distance on a chart • Understand the ffect of usi le factor to enlarge a shape • Recog se variant properties under transformation • Rota objects using turns expressed in degrees.	
130	Recognise the number of 100s in a four digit number • Order decimals up to 3-decimal places • Convert between simple fractions, decima and percentages • Find a simple percentage o a number • Understand equality and ineq ality Continue number and spatial patterns.	Calculate the diffe ence between two times several hours apart • Use easurements presented on a pl to find unkn wn dimension • Use millilitres to es mate the c p ty of a container • Read a scale ma ed in 0.1 cm parts to measure length • gnise p operties o -D and 3-D shapes • Find the stance b tween t o locations on a scale map nlarg a shape by a scale factor.	Recognise and make statements about the distributions of graphs • Describe a general trend in time-series data.
120	Understand the effect of multiplying or divid g by 1 • Estimate simple multipl ation prob m Use simple ratios to so p oblem • Explain why a fraction is greater than other • d a simple fraction of an amount or set Recognis different representations of xe fraction Match a simple number sentenc with a word story • Continue repeating spatia patterns wit two variables.	de by side scales to convert between inches and centimetres • Read scales to tenths • Work out the number of cubes in a shape where some cubes are not visible • Identify which net can be used to make a given box • Use grid references and compass directions to show location • Recognise examples of different transformations.	Identify an appropriate sample for an investigation • Interpret a pictograph with a key, where half units are used • Identify correct statements about distribution on a bar graph • Interpret a stacked bar graph • Understand how changes to data affect the average • Calculate the number of outcomes for a simple combination problem • Recognise equal probabilities • Understand probabilities expressed as unit fractions or as simple ratios.
110			
100	Add nd sub t 2-digit numbers • Solve simple mul plicati n an division problems • Estimate the sum two 3-digit numbers • Recognise which gative umb r is the lowest • Recognise the num er of ens in a 3-digit number • Recognise simpl fractions, decimals, and percentages • Continue simple number and spatial patterns.	Select appropriate units to measure a heavy object • Convert digital to analogue time • Read a half-way mark on a scale marked in 20's • Have a sense of the size of one metre • Draw a shape reflected in a mirror line • Identify movements on a grid • Identify cardinal compass directions.	Interpret information presented in a simple table or graph including a pie graph • Relate information presented in a table to a bar chart • Understand the idea of 'most likely' • Create a bar graph from a given dataset.
0		Recognise that a given container holds about one litre • Identify common shapes • Count the number of cubes in a shape where part of each cube is visible • Recognise a side view from a 3-D representation.	
0			
70	Add groups of 10 • Understand the effect of adding 0 • Write numerals as words • Demonstrate a sense of place value up to 3 digits • Represent a simple fraction as an area • Continue a repeating pattern with one variable.		
	NUMBER AND ALGEBRA	MEASUREMENT AND GEOMETRY	STATISTICS

Figure 2.4 Description of the Mathematics and Statistics (MS) scale

Reporting achievement against curriculum levels

A curriculum alignment exercise was carried out in 2013 to determine the minimum performance expectations (cut scores) on the 2013 NMSSA assessment for students achieving at curriculum levels 2 to 4. The linking of results from 2013 to 2018 allowed these cut scores to be located on the 2018 MS scale, and the 2018 results to be interpreted in terms of achievement against curriculum expectations.

Component 2: Student perspectives on mathematics

Twelve students in each school in the 2018 NMSSA mathematics study were asked to complete a student questionnaire that was administered using a laptop computer. In total, 1150 students at Year 4 and 1162 at Year 8 completed the questionnaire. At both year levels, students could select options to have parts or ll of the questions read to them. For Year 4 students, the stem of each question was read automatically The questionnaire asked students about themselves, their attitude to mathematics, their co fidence in mathematics, how difficult they found mathematics, and their opportunities to learn mathematic

IRT was used to construct reporting scales for the questions in the student questionnair related to attitude and confidence. As for the MS achievement scale, these scales were set to have an aver ge of 100 scale score units and an average standard deviation of 20 scale score units acr ss the ye levels. Two measurement scales were constructed: Attitude to Mathematics and Confidence in Mat ematics. Students were also asked to indicate how often they experienced a range of learning op ortunities in mathematics at school.

Component 3: Teacher and principal perspectiv s on lear ing mathematics

The third component involved two separate questionnaires d loped for teachers and principals, respectively. In total, 240 teachers and 97 principals at Year and 224 teachers and 85 principals at Year 8 completed the questionnaires.

Up to three teachers in each school who taught at he year level assessed were invited to complete a questionnaire. In larger schools, we asked th teache s who had the most students involved in the study to complete the questionnaire. The teacher questionnaire inc uded sections asking teachers about their attitude to mathematics, confidence as a mathematics teacher, the opportunities for students to learn mathematics at school, and professional developme t and support. IRT was used to construct a reporting scale based on the responses to the questions related to confidence as a mathematics teacher. The Confidence in Teaching Mathematics scale was set to have n average of 100 scale score units and an average standard deviation of 20 scale score units acro s the year levels.

The principals of the hools involved in the study were also asked to complete a questionnaire. Principals were able to delega e the ta k to a member of the school leadership team as required.

The principal qu stion ire asked a range of questions about teaching and learning in mathematics across the school, ncluding questions related to strategic planning, assessment planning and policy, inclusion of diverse l arne in mathematics, professional support and resourcing for teaching mathematics.

3 Student Achievement in Mathematics

This chapter describes Year 4 and Year 8 student achievement in mathematics based on results from the 2018 Mathematics and Statistics (MS) assessment.

Within this chapter any reported differences between groups are statistically significant unless s ated otherwise.

Full tables of results related to reporting in this chapter are available in Appendix 1.

1. Overall achievement on the mathematics assessment

Year 8 students scored 33 MS scale score units higher, on average than Year 4 students

Figures 3.1 and 3.2 show the distributions of achievement on the MS scal for Year 4 and Year 8, respectively. On average, Year 8 students scored 33 units higher on th MS cale than Year 4 students. This indicates that, overall, students' achievement increases by 8 MS units per year between Year 4 and Year 8. The annualised difference of 8 MS unit (an ffec size f 0.4) can be considered to represent the amount of 'progress' associated with about one year of instruction. It can be useful to have this in mind when considering achievement differ n es between groups.

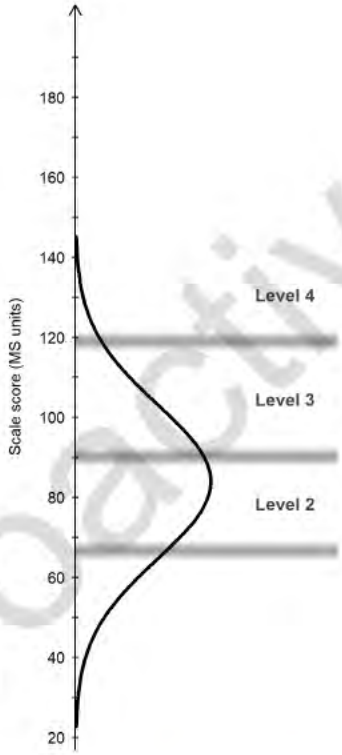


Figure 3.1 Distribution of scores for Year 4 students on the Mathematics and Statistics (MS) scale

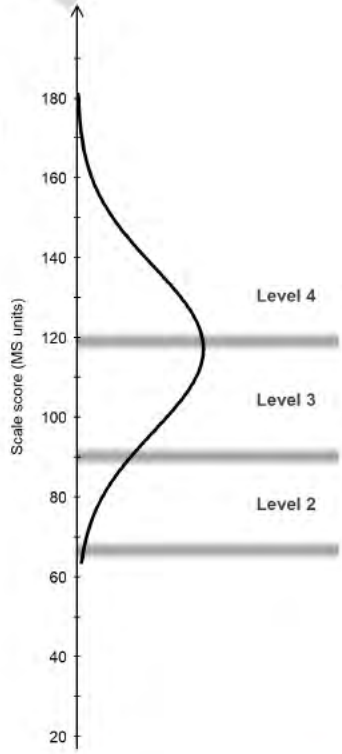


Figure 3.2 Distribution of scores for Year 8 students on the Mathematics and Statistics (MS) scale

2. Achievement against the curriculum

Eighty-one percent of students in Year 4 and 45 percent of students in Year 8 achieved at or above curriculum expectations

At Year 4, 81 percent of students achieved at or above the minimum score on the MS scale associated with achieving at curriculum level 2 (Figure 3.3). At the end of Year 4, the curriculum expectation is for most students to have achieved at Level 2.

At the end of Year 8, the curriculum expectation is for most students to have achieved at Level 4.

In 2018, 45 percent of Year 8 students achieved at Level 4 or above. Most of the remaining students achieved at Level 3.

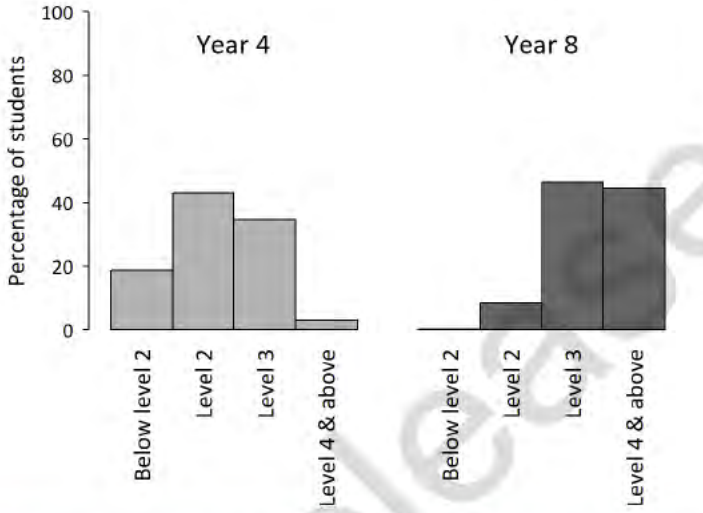


Figure 3.3 Percentage of st dent achieving at different curriculum levels by y ar le l

3. Achievement by student-level var ables

Figures 3.4 and 3.5 display the score distributi ns on the MS scale at Year 4 and Year 8 for all students and by gender and ethnicity[20].

On average, boys scored hi he n mathematics than girls at both Year 4 and Year 8

Boys scored higher, on average, than girls by 3 units at Year 4 and 2 units at Year 8. The score distributions for boys w re also ore spread out than they were for girls at both year levels with a greater standard dev tion r corded for boys at both year levels.

There were differences in mathematics achievement related to ethnicity and special education ne ds status

On average and at both Year 4 and Year 8, non-Māori students scored higher than Māori (by 11 MS units at b th year levels), non-Pacific students scored higher than Pacific students (by 15 MS units at Year 4 nd 13 MS units at Year 8) and Asian students scored higher than non-Asian students (by 9 MS nits at Year 4 and 11 MS units at Year 8).

At Year 4 and Year 8, students with no special education needs scored higher, on average, than those with pecial education needs (by 17 MS units at both year levels).

[20] Non-prioritised ethnicity was used where students could identify with up to three ethnicities. This meant they could be present in multiple ethnic groups. Student ethnicity data were obtained from National Student Number information held on the Ministry of Education ENROL database. The 'New Zealand European' category included New Zealand Pākehā, Australians and British/Irish. The 'Pacific' category included Tokelauan, Fijian, Niuean, Tongan, Cook Islands Māori, Samoan and other Pacific peoples. The 'Asian' category included Filipino, Cambodian, Vietnamese, Other Southeast Asian, Indian, Chinese, Sri Lankan, Japanese, Korean and other Asians.

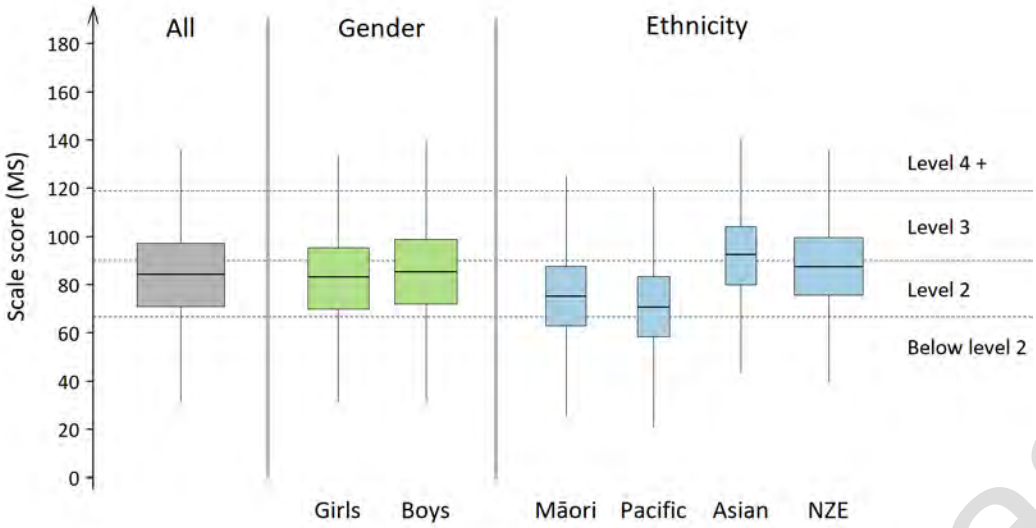


Figure 3.4 Distribution of scores for Year 4 students on the Mathematics and Statistics (MS) scale, by gender and ethnicity (NZE=New Zealand European)

Figure 3.5 Distribution of scores for Year 8 students on the Mathematics and Statistics (MS) scale, by gender and ethnicity (NZE=New Zealand European)

4. Achievement by school-level variables

Figures 3.6 and 3.7 show the performance of students according to school decile band[21] and school type[22].

Students attending high decile schools scored higher, on average, than those attending mid or low decile schools

At both year levels, the average score on the MS assessment for students from high decile schools was higher than the average scores for students from mid and low decile schools. At Year 4, the difference between the average scores for students in the high and low decile bands was 20 MS units. At Year 8, it was 18 MS units.

At Year 8, students attending secondary schools scored higher, on average, than those attending intermediate and full primary schools

Year 8 students attending schools classified as secondary schools scored higher, on averag than Year 8 students attending intermediate schools (by 4 MS units) or full primary schools (by 3 MS units) It is important to note that nearly all of the secondary schools in the study were mid and igh decile schools, while full primary and intermediate schools were more evenly distributed cross the decile bands. The difference in the average scores for students attending intermed ate s ho ls compared with those attending full primary schools was not statistically significant.

[21] The *low* decile band comprised students in decile 1 to decile 3 schools, the *mid* band comprised students in decile 4 to decile 7 schools, and the *high* band comprised students in decile 8 to decile 10 schools.

[22] A *composite* school combines students from different year levels that are typically found in separate primary or secondary schools. A *restricted composite*, sometimes known as a middle school, caters for Years 7 to 10. A *contributing* school caters for Years 1 to 6 of schooling. A *full primary* school caters for Years 1 to 8 of schooling. *Secondary* schools cater for Year 7 to Year 15 of schooling, although many cater for Year 9 to Year 15 only. An *intermediate* school caters for Years 7 and 8 of schooling. The number of students in the study from restricted composite and composite schools was relatively low (44 and 82 students, respectively).

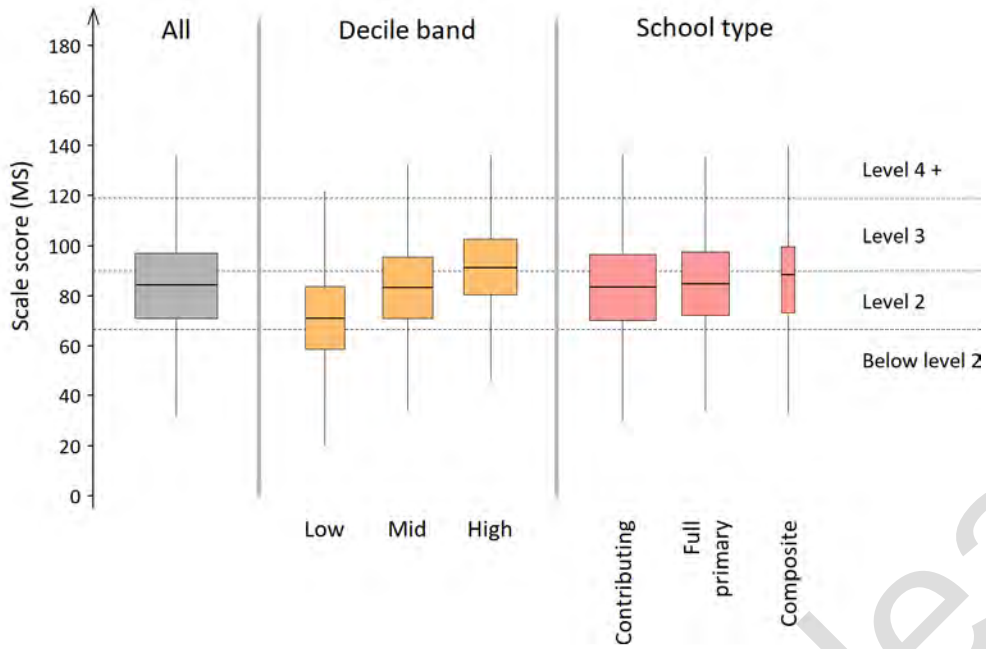
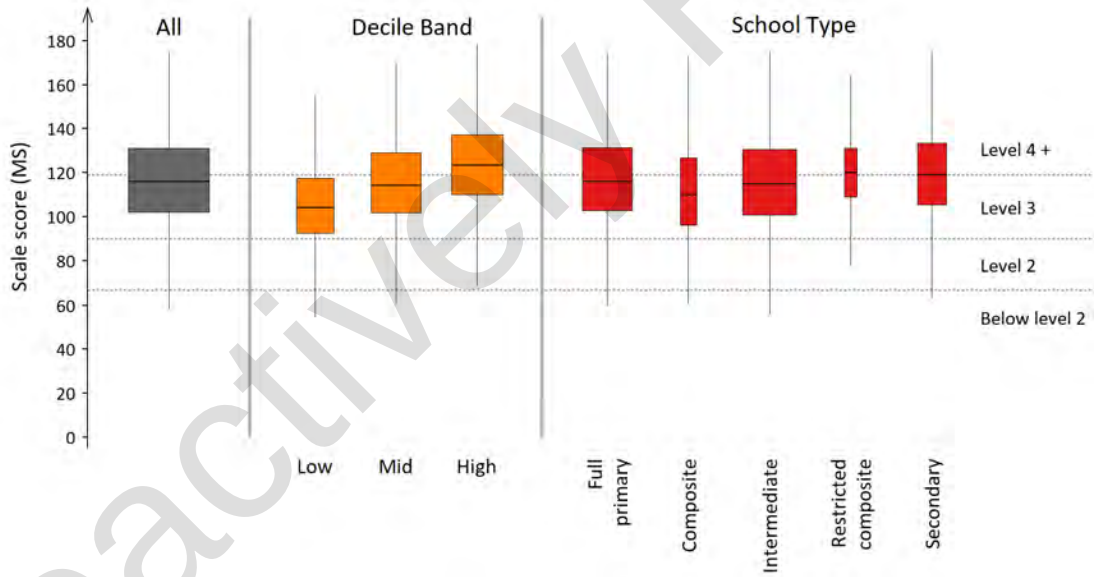


Figure 3.6 Distribution of scores for Year 4 students on the Mathematics and Statistics (MS) scale, by decile band and school type



Figu e 3.7 istribution of scores for Year 8 students on the Mathematics (MS) scale, by decile band and school t pe

5. Changes in achievement since 2013

Mathematics was last assessed by NMSSA in 2013. In order to make comparisons between 2013 and 2018, a linking exercise was undertaken based on the common items used at both points of time[23]. This allowed student achievement in 2013 to be located on the scale that has been constructed to report 2018 data.

As noted in Chapter 2, the process used to link results from 2018 to 2013 involved reconstructing the 2013 achievement distributions using the plausible values approach employed in 2018. This means that achievement statistics for 2013 presented in this section differ from the statistics presented in the original 2013 report.

Overall, average achievement at Year 8 was higher in 2018 than in 2013

The linking exercise indicated an increase of 3 MS units in average achievement for all students at Year 8 and 1 unit for all students at Year 4 between 2013 and 2018 (Figure 3.8)[24]. The difference was statistically significant at Year 8 but not Year 4.

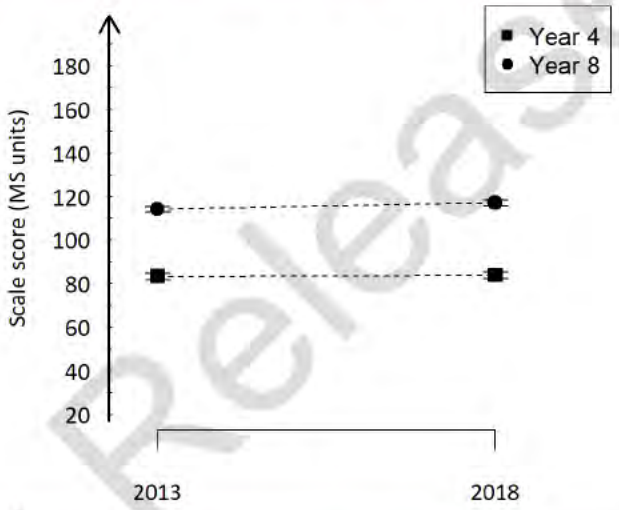


Fig re 3.8 Average achievement in mathematics and statistics in 2013 and 2018, by year level

At Year 8, the proportion of s udents achieving at or above c rric lum expectations showed a corres onding increase from 41 percent to 45 percent (Figure 3.9).

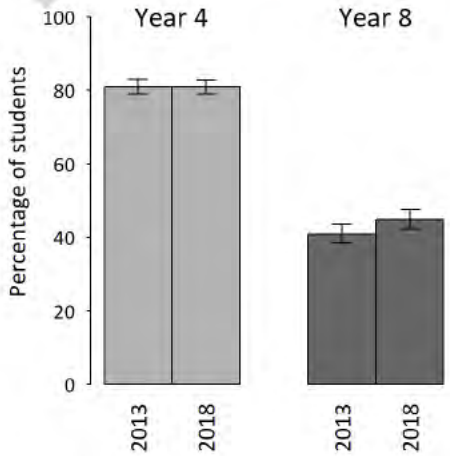


Figure 3.9 The proportion of students achieving at or above curriculum expectations in 2013 and 2018, by year level

[23] See Appendix 6 of *NMSSA Report 21 Technical Information 2018* for details of the exercise used to link results from 2013 with 2018.
[24] Numbers have been rounded to whole numbers.

Statistically significant increases in average achievement were recorded for several subgroups between 2013 and 2018

The average scores for Year 4 boys, Year 8 girls, Year 8 boys, Year 8 Pacific students and Year 8 students in low decile schools increased between 2013 and 2018 (Table 3.1)[25].

Table 3.1 Change in average score on the Mathematics and Statistics (MS) scale between 2013 and 2018 by year level, gender, ethnicity and decile band

Year 4			Year 8		
	Difference in average scores (MS units)*	95 percent confidence interval (MS units)		Difference in average scores (MS units)*	95 percent confid nce interval (MS ni s)
All students	0.5	(-1.3, 2.3)	**All students**	**2.8**	(1 1 4.6)
Girls	-1.9	(-4.1, 0.4)	**Girls**	**3.3**	(1.1, .5)
Boys	**2.7**	(0.4, 4.9)	**Boys**	**2.4**	(0.0, 4.7)
NZE	0.8	(-1.2, 2.8)	**NZE**	1 3	(-0.7, 3.2)
Māori	0.6	(-2.5, 3.7)	**Māori**	1.1	(-1.8, 4.0)
Pacific	-1.6	(-5.2, 2.1)	**Pacific**	**6.3**	(2.7, 9.9)
Asian	1.3	(-2.6, 5.1)	**Asian**	0.6	(-4.7, 5.9)
Low	0.0	(-3.0, 3.0)	**Low**	**4.5**	(1.5, 7.6)
Mid	0.0	(-2.5, 2.5)	**Mid**	2.0	(-0.3, 4.4)
High	1.8	(-0.5, 4.0)	**Hig**	1.3	(-1.3, 3.8)

* Bolded numbers indicate the difference is statistically signific nt ($p<0.05$)

[25] It is important to note the size of the confidence interval when considering the differences in average scores between 2013 and 2018. For some population groups these intervals are very wide.

4 Contextual Findings: Learning and Teaching in Mathematics

This chapter explores data collected about learning and teaching in mathematics using the student, teacher and principal questionnaires. The chapter is divided into three sections with each focused on one of the questionnaires. Where the same or similar questions were asked in 2013, a short description looking back t the responses made in that year is provided.

Missing responses

It is important to note that for some questions in the Year 4 student questionnaire there we e elatively high numbers of missing (non) responses (up to 20 percent)[26]. To make sure this is acknowle ged th percentage of missing responses are included when we report how students respond d to a ues ion. We also only report 'notable'[27] differences in response patterns between groups when the diff rences are present regardless of whether the missing responses have been included when calc lating response frequencies.

1. Students' perspectives on learning in mathem tics

Twelve students in each school involved in the 2018 NMSSA mathematics study were asked to complete a student questionnaire. In total, 1150 students completed the uestionnaire at Year 4 and 1162 at Year 8. Table 4.1 shows the percentage of students respondi g to the qu stionnaire, by decile band and year level. The questionnaire asked students about their attitudes to mathematics, their confidence in learning mathematics, opportunities to learn mathem tics a school and how difficult they found mathematics at school.

Table 4.1 Percentage of students who responde to t e mathematics questionnaire, by school decile band and year level

	Percentage of Students	
Decile band	**Year 4** ***N*=1150**	**Year 8** ***N*=1162**
Low	24	23
Mid	37	37
High	39	40

Students' attitudes to mathematics

Overal students had a positive attitude towards learning mathematics at school

Mo students in Year 4 and Year 8 indicated at least some level of agreement with each of six statements related to their attitude towards learning mathematics at school (Figure 4.1). For example, at Year 4, 75 percent of students used 'agree a lot' or 'totally agree' to respond to the statement 'I like learning maths at school'. At Year 8, the corresponding percentage was 64 percent. Overall, Year 8 students were less likely than those in Year 4 to use the 'totally agree' category when responding to each of the statements.

[26] The pattern of non-response observed at Year 4 in 2018 has not been observed previously in NMSSA studies. It may have involved a level of confusion with how to use the computer to answer the questionnaire. It has led to changes in the way we present and administer the student questionnaire in 2019. In general, students who were more likely to leave questions unanswered were from low decile schools, Pacific students and students with special education needs compared with students from mid and high decile schools, non-Pacific students and students with no special education needs, respectively.

[27] A 'notable' difference is defined as a difference in response frequency of 10 percentage points or greater.

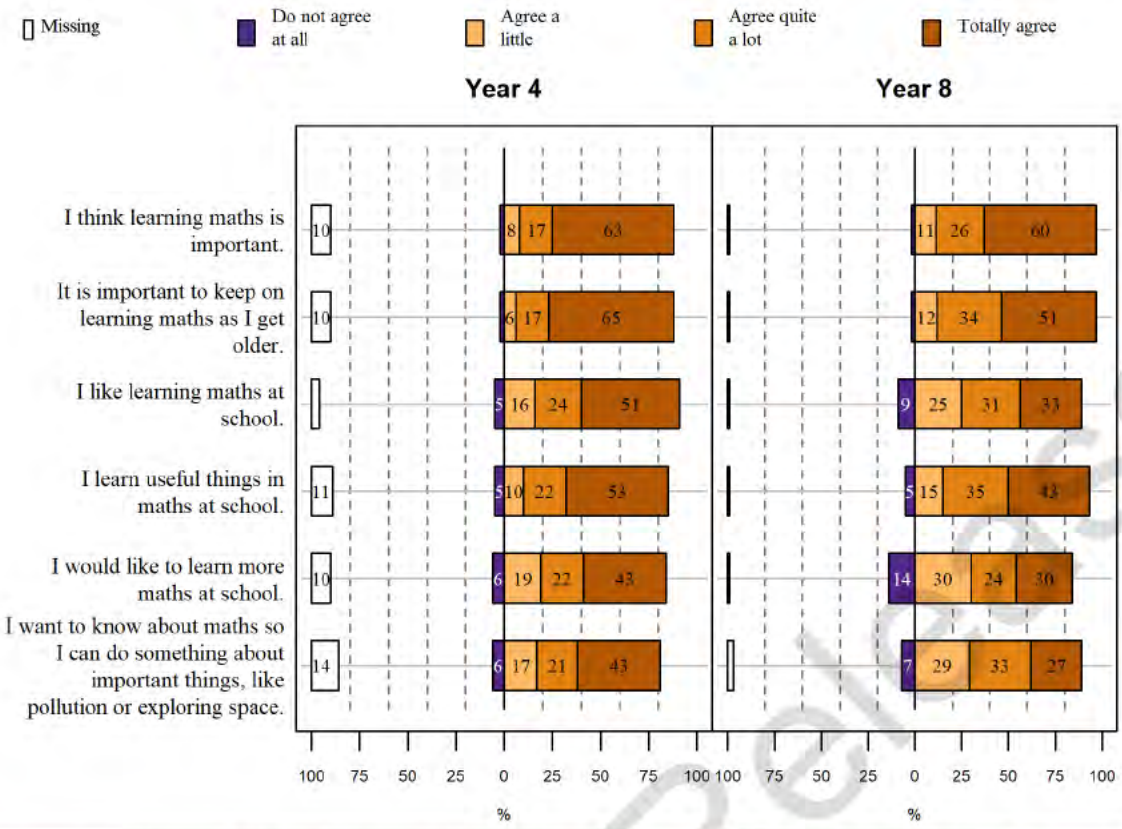


Figure 4.1 Percentage of student responses to statements about heir ttitude mathematics, by year level

Attitude to Mathematics scale

Responses to the six attitude statements w re u d to construct an Attitude to Mathematics scale. To aid interpretation, the scale was broken down into hree sco ranges. The 'very positive' part of the scale was associated with students mainly using the 'tot lly agree' ca egory to respond to the statements, the 'positive' section of the scale was associated with student mainly using either 'agree a lot' or 'agree a little', and the 'not positive' part of the scale was as oci ted w th students mainly using 'do not agree at all'.

On average, Year 8 students attitudes towards mathematics were less positive than Year 4 students

Year 8 students, on a erage, scored lower n the Attitude to Mathematics scale than Year 4 studen by 7 scale score units (Fig re 4 2) It has been typical of mos learning areas assessed by NM SA to see lower attitude scores, on average, for Year 8 tudents compared to students in Year 4.

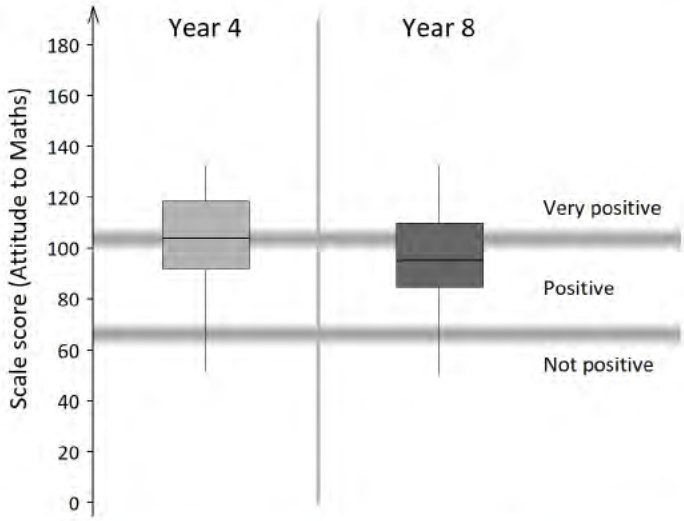


Figure 4.2 Distribution of students' scores on the Attitude to Mathematics scale, by year level

There were differences in Attitude to Mathematics scores related to gender, ethnicity, school type and decile band

On average, and at both year levels:

- Pacific students scored higher on the Attitude to Mathematics scale than non-Pacific students (at Year 4 by 6 scale score units, and at Year 8 by 7 scale score units)
- students with special education needs scored lower on the Attitude to Mathematics scale than those with no special education needs (by 4 scale score units at Year 4, and by 10 scale score units at Year 8).

There were additional differences at the Year 8 level. On average, at Year 8:

- boys scored higher on the Attitude to Mathematics scale than girls by 4 scale score units
- Māori students scored higher on the Attitude to Mathematics scale than non-Māo i by 3 cale score units
- Asian students scored higher on the Attitude to Mathematics scale than non-Asian s dents by 6 scale score units
- New Zealand European students scored lower on the Atti ude t Mathematics scale than students who were not identified as New Zealand European by 7 cale core units
- students in full primary and intermediate schools scored higher n th Attitude to Mathematics scale than those attending secondary schools (by 4 and 6 s ale cor units, respectively)
- students at low decile schools scored higher, on average, on th Attitude to Mathematics scale than students at mid and high decile schools (by 8 scale s units).

Looking back

An Attitude to Mathematics scale was also co structed in 2013. As the statements and response categories used to construct the scale were slightly different to those used in 2018, the results are not directly comparable. However, the overall patterns were similar, with most students being positive about mathematics, and with Year 4 stud nts b ing more positive than those at Year 8.

Students' confidence in math ma ic

Most students indica ed confidence in their mathematics abilities

Overall, most students at bot Year 4 and Year 8 indicated some level of agreement with each of four statements related to thei sense of confidence as a mathematics learner (Figure 4.3). Less than 10 percent of students i both year levels used the 'do not agree at all' response category when responding t each f the statements. Year 4 students were more likely to indicate that they 'totally agreed with ea h statement than Year 8 students.

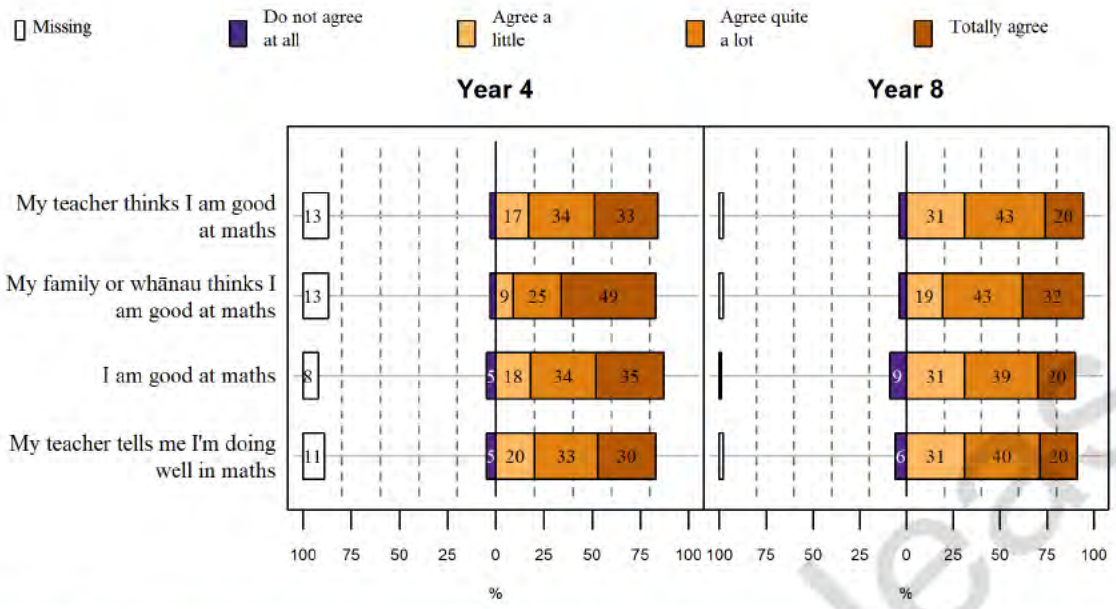


Figure 4.3 Percentage of student responses to statements about their confidence in mat matics, by year level

Confidence in Mathematics scale

The students' responses to the four confidence statem nts were used to construct a 'Confidence in Mathematics' scale. The confidence scale was divided into ree score ranges (very confident, confident and not confident) to aid the interpretation of scale scores.

Students in Year 8, on average, i dica ed less confidence overall in mathematics than students in Year 4

Year 8 students scored lower, on average, on the Confidence n Mathematics scale than Year 4 students by 8 scale sc re unit (Figure 4.4). Mos stude ts at both year level cored in the 'confident' o 'very confident' parts of th scal

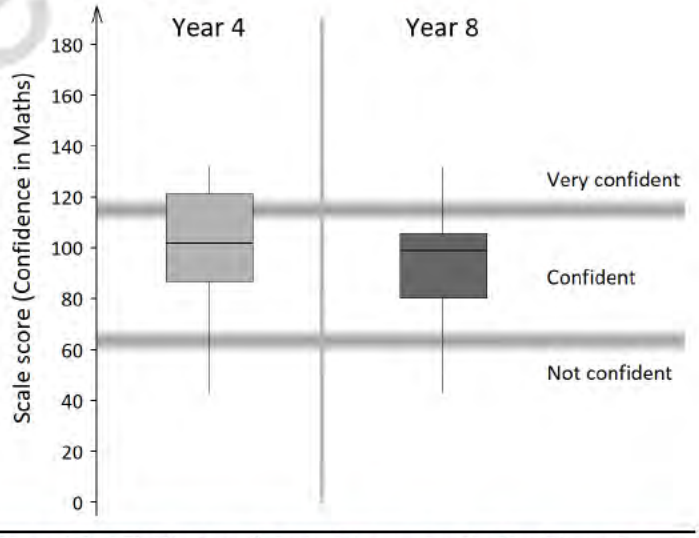


Figure 4.4 Distribution of students' scores on the Confidence in Mathematics scale, by year level

On average, boys indicated a higher level of confidence in mathematics than girls

At both year levels, boys scored higher, on average, than girls on the Confidence in Mathematics scale. The difference in average scores was greater at Year 8 than at Year 4 (4 scale score units at Year 4, and 8 scale score units at Year 8).

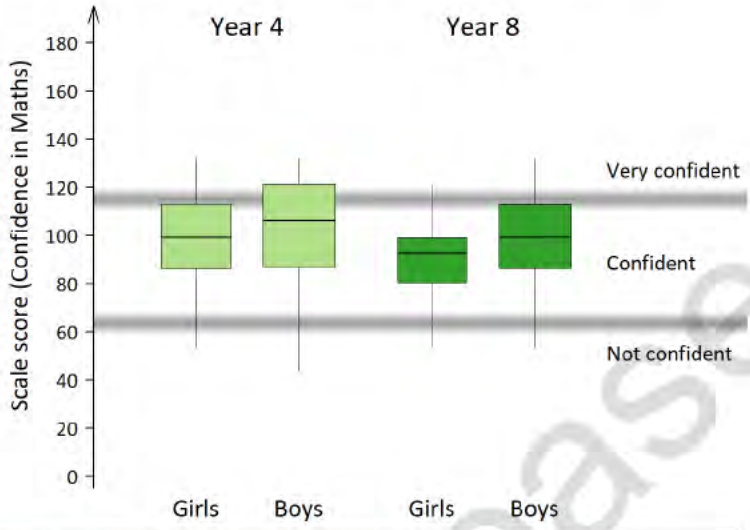


Figure 4.5 Distribution of students' scores on t e Co fid nce in Mathematics scale, by year le el and g nder

There were differences in levels of confidence in mathemati s associated with a range of subgroups

At Year 4, students with special education needs w re less confident, on average, than those with no special education needs by 5 scale score units. At Year the difference was 10 scale score units.

Year 8 students in intermediate schools, on average, scored higher on the Confidence in Mathematics scale than students attending composite or secondary schools (by 6 and 4 scale score units, respectively).

Looking back

In 2013, students were asked how much they agreed with three similar statements regarding their confidence in mathematics. Th se i ems were not used to construct a confidence scale in 2013, but rather contributed to the attitude scale. As in 2018, most students showed some level of agreement with each statement an overall, tudents in Year 4 indicated higher levels of agreement compared with students in Yea 8.

The relationship between attitude to mathematics, confidence in mathematics and achievement in mathematics

Attitu e to Mathematics scores and Confidence in Mathematics scores were more highly co related with achievement in mathematics at Year 8 than Year 4

Scores on both the Attitude to Mathematics scale and Confidence in Mathematics scale were positively c rela ed with achievement on the Mathematics and Statistics (MS) assessment at both year levels (see Table 4.2). At both year levels, the magnitude of the correlation coefficient was greater between confidence and achievement than attitude and achievement. For both attitude and confidence, the association with achievement was stronger at Year 8 than Year 4.

Table 4.2 Correlations between the attitudinal scales (Attitude to Mathematics and Confidence in Mathematics) and achievement in mathematics, by year level

	Attitude to Mathematics*	Confidence in Mathematics*
Achievement in mathematics at Year 4	0.12	0.21
Achievement in mathematics at Year 8	0.17	0.37

* All correlations were statistically significant at $p<0.01$

Figure 4.6 uses boxplots to show the relationship between achievement and confidence in mathematics at Year 8. Each boxplot shows the achievement distribution associated with a different level of confidence: 'very confident, 'confident' and 'not confident'. As can be seen, students whose overall response to the confidence items was categorised as 'very confident' typically scored higher on the MS assessment than those whose response was categorised as 'confident' or 'not confident'.

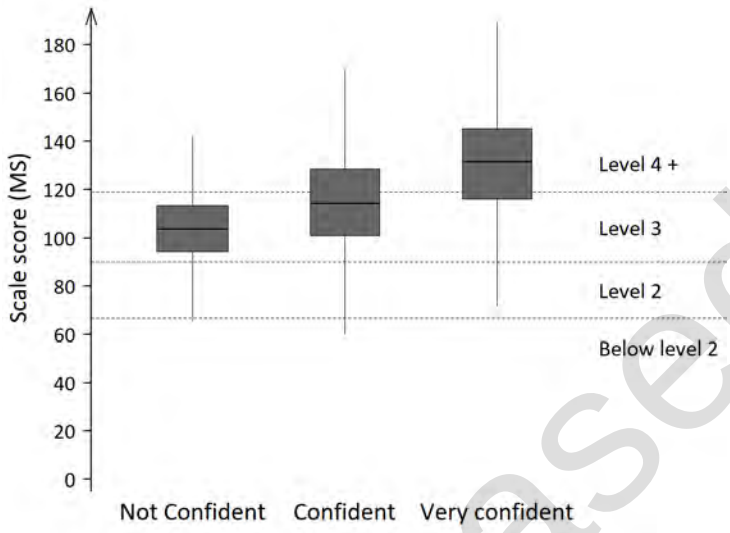


Figure 4.6 Distribution of Year 8 stude ts' sc es on the Mathematics and Statistics (MS) s le ac ordi g to evel of confidence on the Confidence in Math mat s scale

Students' opportunities to learn mathematics

Presented with a range of statements describing learning oppor nities i mathematics, most students in Year 4 and Year 8 indicated that they were involved in ch o po ity at least 'once or twice a month' and usually on a weekly or daily basis (Figure 4.7).

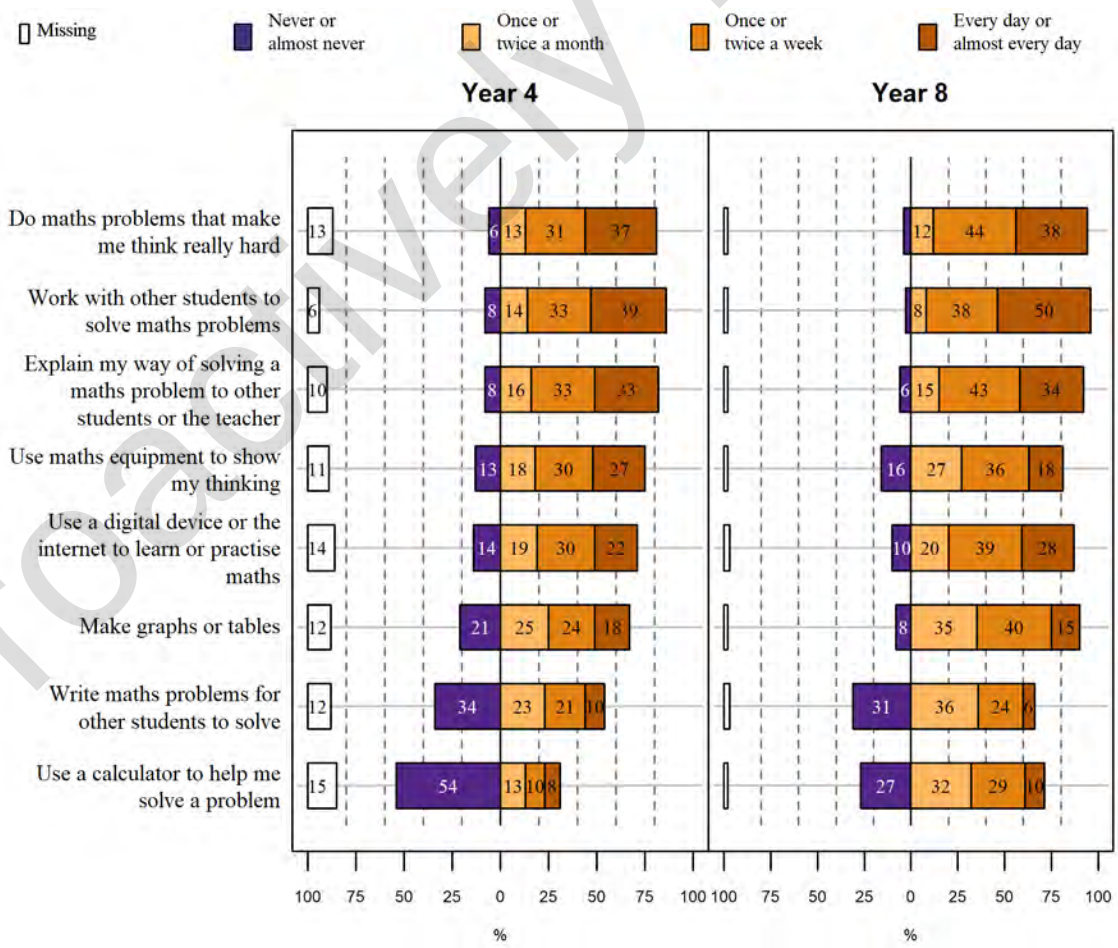


Figure 4.7 Percentage of students' responses regarding their involvement in a range of learning opportunities in mathematics, by year level

At Year 4, a majority of students indicated they 'never or almost never' use a calculator to solve problems

Over half the Year 4 students and about a quarter of Year 8 students indicated they 'never or almost never' use a calculator to solve problems (Figure 4.7). At Year 4, there were differences in the way students responded to this question associated with ethnicity:

- Non-Māori students were more likely than Māori students, to respond with 'never or almost never' (57 percent compared with 44 percent).
- Non-Pacific students were more likely than Pacific students, to respond with 'never or almost never' (57 percent compared with 45 percent).
- Asian students were more likely than non-Asian students to respond with 'never or almost never (65 percent compared with 53 percent).

Around one third of students reported they 'never or almost never' write maths problems for other students to solve

Thirty-five percent of students at Year 4 and 32 percent at Year 8 indicated they never or almost never' write maths problems for other students to solve (Figure 4.7). Th s pat ern of response was generally consistent across subgroups; however, at Year 4, Pacific stu ents ere le s likely than non-Pacific students to respond with 'never or almost never' (23 percent ompared with 36 percent, respectively). At Year 8, students attending high decile schools were more likely than those at low decile schools to respond with 'never or almost never' (36 p rcen c mpa ed with 25 percent).

Looking back

In 2013, students were asked to rate six stateme t that described learning opportunities in mathematics at school. Only one statement was the same those included in 2018: 'Explain my way of solving a maths problem to other students or he teacher . Students' responses to this statement in 2013 indicated that Year 4 students did this more often than Year 8 students, while in 2018 the reverse pattern was evident. However, it is impor nt to n t that, as the response categories used in 2013 were different to those used in 2018, the re lts are not directly comparable across years.

Talking to their teacher about th ir mathematics learning

Around one in six students indicated that they 'never or almost never' talked to their teacher about how they are doing or their next learning steps in mathematics

Students responded to two statements related to talking with their teacher about their learning in mathematics (Figure 4 8). For each statement, between 15 and 18 percent of students responded with 'never or almos never .

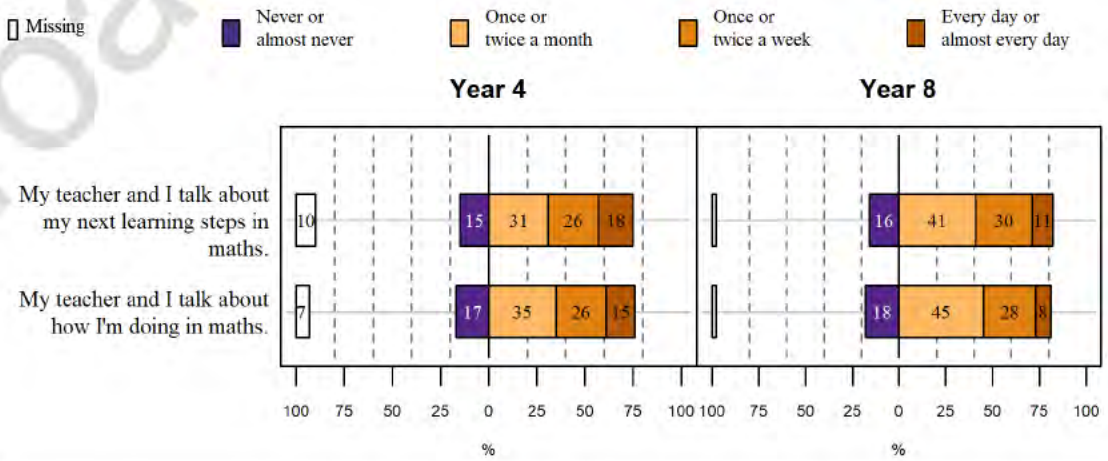


Figure 4.8 Percentage of students' responses regarding how often they talk with their teacher about their learning in mathematics, by year level

Students' perceptions of the difficulty of their mathematics learning

Most students rated the learning they did in mathematics as 'about right for me'

When asked to rate the learning they did in mathematics in terms of difficulty, 80 percent of students at Year 8 and 72 percent at Year 4 responded using the 'about right for me' category (Figure 4.9). Of the remaining students, a greater proportion at each year level indicated that the mathematics they did was 'too easy' rather than 'too hard'.

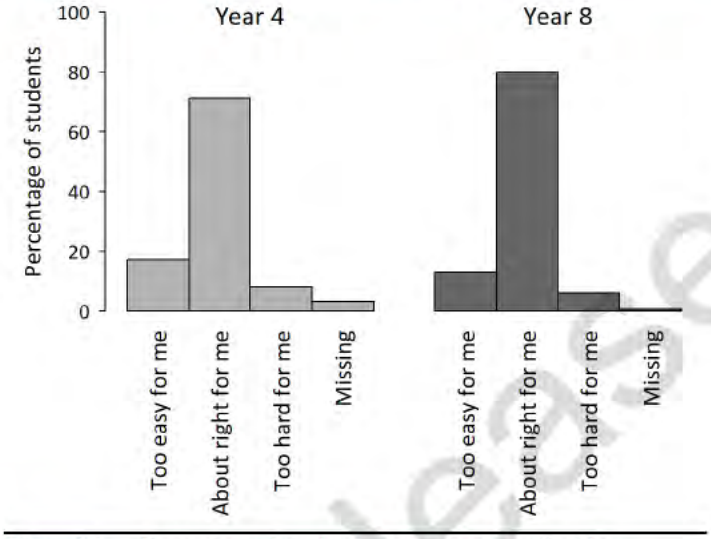


Figure 4.9 Percentage of students espo ses r garding the difficulty of their mathema ics learning, by year level

At Year 4, how students perceived the difficulty of their ea nin in mathematics varied by gender, ethnicity and school decile

At Year 4, a greater proportion of boys than girls ind cated they hink the learning they do in maths is 'too easy for me' (23 percent and 11 percent, respectively)

Year 4 students at low decile schools were less likely than those at high decile schools to report the learning they do in maths is about right for them (64 percent and 77 percent, respectively). At low decile schools, 12 percent of students indicated he learning they did in maths was 'too hard for me' compared with 6 percent at high decile schools.

At Year 4, 62 percent of Pacific students indicated their mathematics learning was 'about right for me' compared with 73 percent of n n-P cific students. Twenty-one percent of Pacific students indicated their learning in mathemati s was 'too easy' and 11 percent indicated it was 'too hard'. This compared with 17 percent and 8 pe cent for n-Pacific students.

2. Teachers' perspectives on learning and teaching in mathematics

Up to three teach rs fr m each school were asked to fill in the teacher questionnaire. The teachers invited to participa e were ose who had the most students involved in the NMSSA study. Table 4.3 shows the percentag of eachers by school decile band at Year 4 and Year 8. Note that the teachers who completed the uestion aires at each year level do not necessarily constitute nationally representative samples. The indings rel ted to teachers should be interpreted as a broad indication of New Zealand teachers' views a out learning in mathematics.

Table 4.3 Percentage of teachers who responded to the questions related to mathematics in the questionnaire, by school decile band and year level

	Percentage of Teachers	
Decile band	**Year 4 (*N*=240)**	**Year 8 (*N*=224)**
Low	23	22
Mid	37	34
High	40	43

At Year 4, 82 percent of the teachers who responded were female, 15 percent were male, and a small number did not provide information about their gender. Fifty-three percent of the Year 4 teachers had taught for 11 years or more. At Year 4, one teacher indicated that they were a specialist teacher of mathematics.

At Year 8, 69 percent of the teachers who responded were female, 28 percent male, and a small number did not provide information about their gender. Sixty percent of the Year 8 teachers had taught for 11 years or more. At Year 8, 10 teachers indicated that they were a specialist teacher of mathematics.

Twenty-five percent of the teachers at Year 4 and 28 percent at Year 8 indicated that they had syndicate, school, or Community of Learning/Kāhui Ako leadership responsibilities for mathematics. At both year levels, around 40 percent of responding teachers at low decile schools had mathematics leadership ol s. This compared with 20 percent of those at mid decile schools. At high decile schools, 19 percent of Year 4 and 30 percent of Year 8 teachers indicated they had leadership roles in mathematics.

Qualifications in mathematics

Year 8 teachers were more likely than Year 4 teachers to indicate that they had a qualification related to mathematics

The proportion of teachers who indicated that they had a specialist fo us in their initial teacher education or had an undergraduate or post graduate mathematic qua ification was greater at Year 8 than at Year 4 (Table 4.4). Small proportions of tea her at b th ye r levels indicated they had mathematics-related work experience, such as being a mathematics/numeracy advisor, or were Maths Support Teachers.

Table 4.4 Percentage of teachers indicating that they had a specia t focus in their teacher training, qualifications related to mathematics, and/or work experi nce in mathematics, by year level

	Year 4 (%)*	Year 8 (%)
Specialist mathematics education focus in initial te cher edu ation	4	15
Undergraduate/postgraduate qualificat on in mathematics	4	8
Worked in the mathematics field (e.g mat / meracy advisor)	3	4
Maths Support Teacher	3	3

* Teachers were able to ck all c tegories that applied

Twelve perce t of Year 4 teachers and 16 percent of Year 8 teachers indicated they had other mathematics-re ated qualifications, training or practical experience. These included Accelerated Learning in Mathematics (ALiM) training, Numeracy Development Project professional learning and developm nt (PLD) or attending mathematics PLD workshops.

Teachers' attitudes to mathematics

All teachers agreed teaching mathematics is important and most enjoy teaching mathematics

All teachers agreed with the statement: 'I think teaching maths is important', with most teachers responding with 'strongly agree'. Most teachers at Year 4 and Year 8 agreed that they personally enjoy mathematics and like teaching it (Figure 4.10).

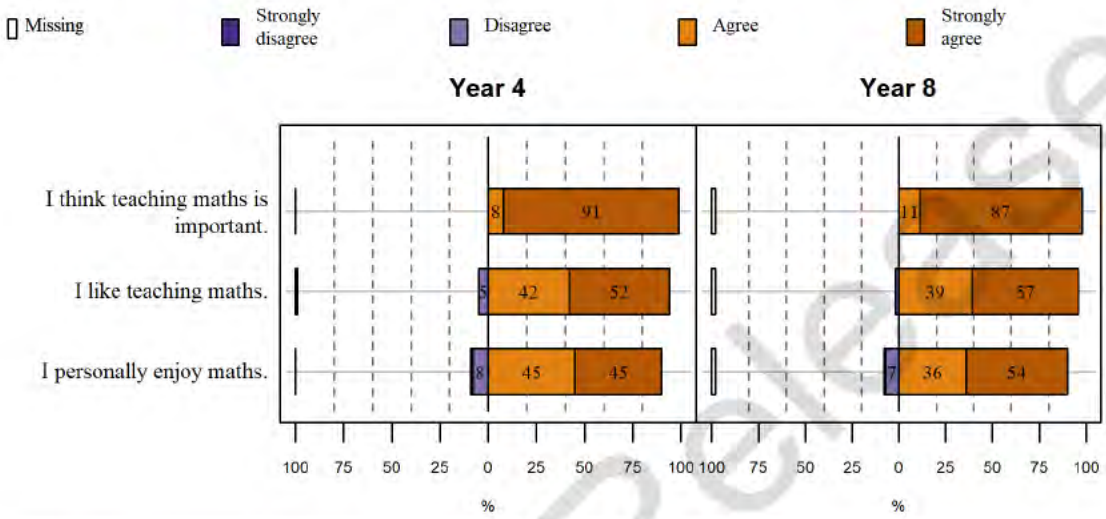


Figure 4.10 Percentage of teachers' responses to statements b ut their attitudes to mathematics, by year level

Looking back

In 2013, teachers were asked to res ond two statements about their attitudes to teaching mathematics: 'I personally enjoy the curriculum area of maths' and 'I like teaching maths'. A different response scale was used: 'not at all true for m ', 'sl ghtly true for me', 'moderately true for me' and 'very true for me'. Around 70 pe c nt of teachers at Year 8 and 60 percent of teachers at Year 4 responded using 'Very true for me' to b th statements.

Teachers' confidence in teaching mathematics

Most teachers expressed confidence in their mathematics teaching

Most teachers used 'agree' or 'strongly agree' to respond to each of a series of eight statements related to their confidence in teaching mathematics (Figure 4.11). The response patterns for teachers at both year levels were very similar.

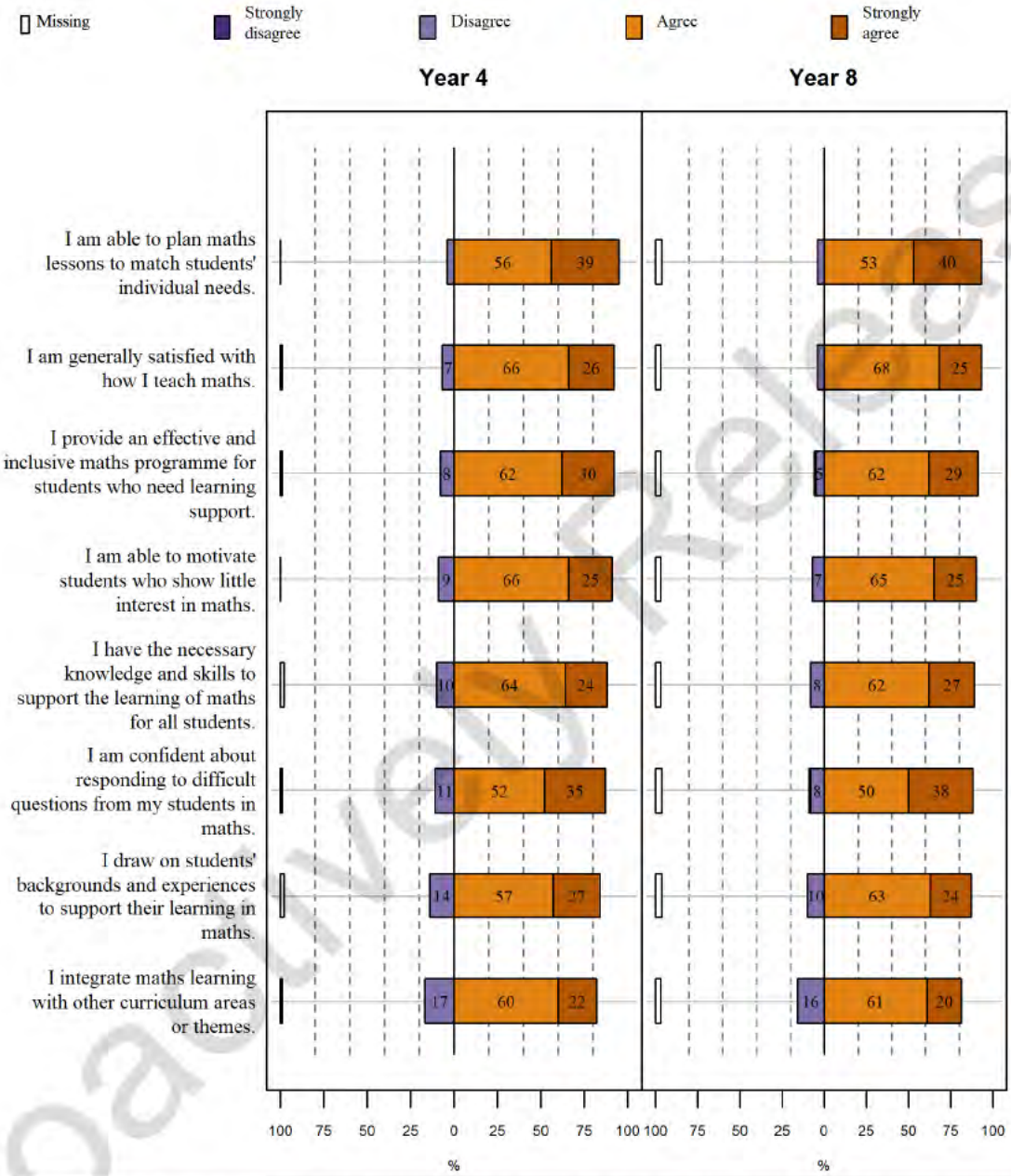


Fig. 4.11 Percentage of teachers' responses to statements about their confidence in teaching mathematics, by year level

Looking back

In 2013, teachers were asked to respond to nine statements related to their confidence as mathematics teachers. The teachers used a different response scale to that used in 2018: 'not at all true for me', 'slightly true for me', 'moderately true for me' and 'very true for me'.

Two of the statements were similar to the statements used in 2018:

- 'I am generally satisfied with the ways that I teach maths'
- 'I am able to motivate students who show little interest in maths'.

Once again, the response categories used in 2013 were different to those used in 2018, asking teachers to indicate how true each statement was for them. In 2013, about 25 percent of teachers at Year 4 and 40 percent at Year 8 responded with 'very true for me' to the first statement and about 40 percent of teacher at each year level responded with 'very true for me' to the second. The overall pattern in 2013 was hat Year 8 teachers expressed slightly higher confidence levels than Year 4 teachers.

Confidence in Teaching Mathematics scale

In 2018, teachers' responses to the eight confidence statements were used to construct a Confidence in Teaching Mathematics scale[28]. The scale was divided into 'very confident', 'con iden and not confident' score regions in the same way as the student attitude and confidence scales.

Most teachers expressed confidence in their mathematics tea hing

Most teachers' scores on the Confidence in Teaching Mathematics scale indicated they were 'Confident' or 'Very confident'.

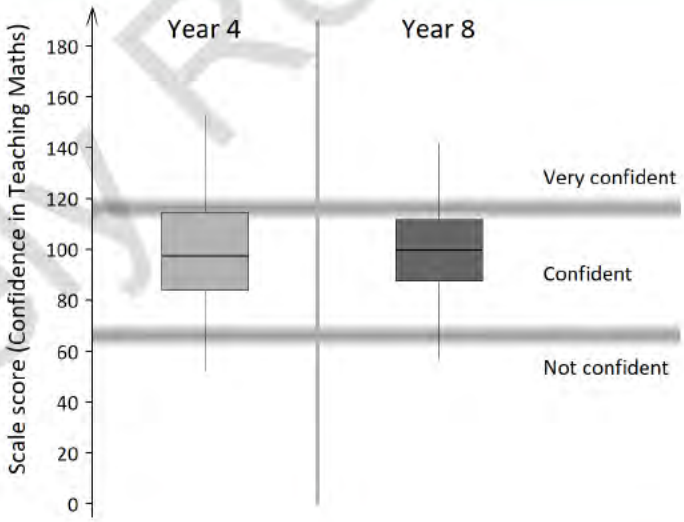


Figure 4.12 Distribution of teachers' scores on the Confidence in Teaching Mathematics scale, by year level

[28] Cycle 2 (which began in 2017) is the first cycle of assessment programmes where NMSSA has constructed measurement scales based on teachers' responses.

Teacher confidence in each sub-strand of mathematics

At both year levels, teachers indicated the greatest confidence in teaching number and the least confidence in teaching algebra

As well as responding to statements about their confidence in teaching mathematics overall, teachers were asked to rate their confidence in each sub-strand of mathematics. The majority of teachers at both year levels indicated they were 'moderately confident' or 'very confident' in teaching Number (Figure 4.13). Teachers at both year levels expressed the least confidence in teaching Algebra.

Year 8 teachers expressed greater confidence than Year 4 teachers in teaching all sub strands of mathematics and statistics

Overall, Year 8 teachers expressed greater confidence than Year 4 teachers regarding teaching each f the sub-strands of the mathematics and statistics learning area (Figure 4.13).

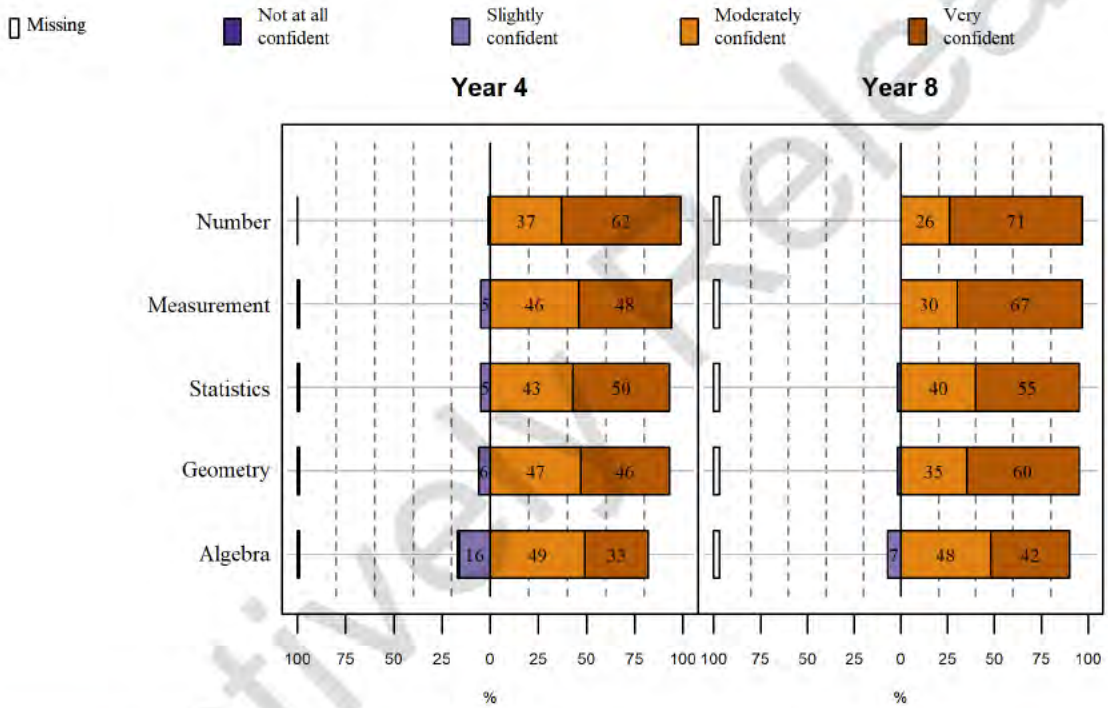
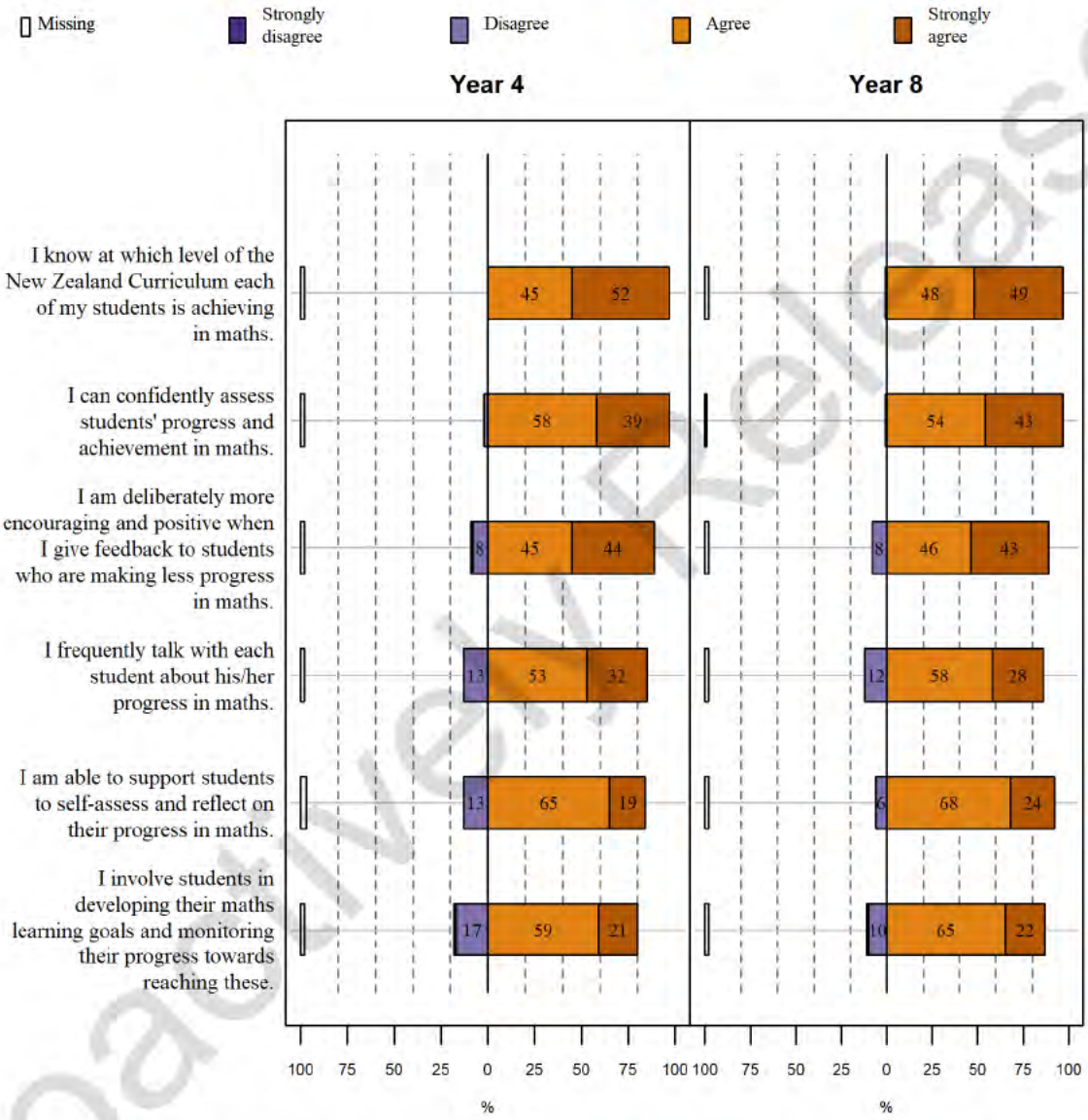


Figure 4.13 Pe centage f teachers' ratings of their confidence for teaching each sub-strand of mathematics, by year lev l

Teachers agreed they know at which level of the New Zealand Curriculum each of their students is achieving in mathematics

All teachers agreed they know at which level of the New Zealand Curriculum each of their students is achieving in mathematics (Figure 4.14). In line with this, teachers showed almost unanimous agreement that they can confidently assess students' progress and achievement in mathematics.



F ure 4 14 Percentage of teachers' responses to statements about assessment and feedback in mathematics, by year level

Time spent learning mathematics

The majority of teachers indicated their students spent three to five hours per week, on average, learning mathematics

Teachers were asked to indicate the amount of time their students spent, on average, learning mathematics each week (Figure 4.15). At both year levels, the most common response was 3 to 5 hours (75 percent at Year 4 and 68 percent at Year 8). Only a very small percentage of teachers indicated that their students spend less than three hours a week, on average, learning mathematics (3 percent at Year 4 and 6 percent at Year 8).

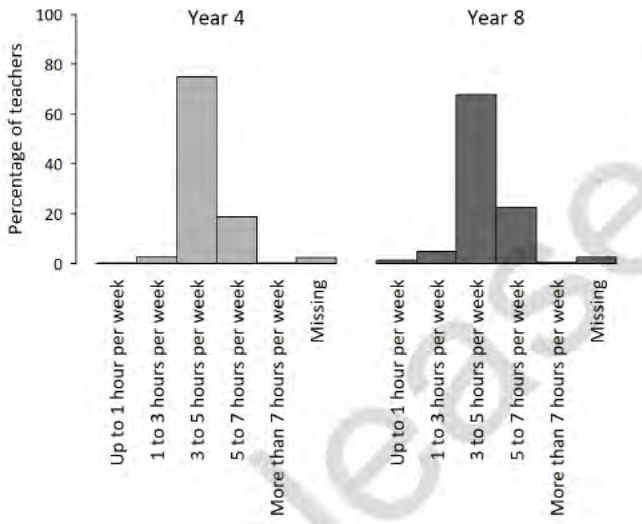


Figure 4.15 Percenta e o teac ers' responses regarding the amo nt o ime st dents spend learning mat ematics, on average, by year level

Organisational strategies for mathematics

Ability group-based activities were used regularly as an organisational strategy for teaching mathematics

Most teachers reported regularly using a range of organisational strategies for teaching mathematics (Figure 4.16). Of the strategies presented, ability group-based activities were used the most regularly with 58 percent of teachers at Year 4 and 46 percent at Year 8 reporting they used ability group activities 'every day or almost every day'.

Around a third of teachers at each year level reported that they 'never or almost never' used different interest or social groups.

A notable difference related to school decile was that at Year 4 the reported use of ability gr p-ba ed activities was lowest among teachers at low decile schools (48 percent responded 'every d y or almost every day' compared to 62 and 61 percent at mid and high decile schools, respectively), but at Yea 8 it was highest among teachers at low decile schools (58 percent of teachers at low decile schoo s responded 'every day or almost every day' compared with 35 percent at mid decile and 47 percent at high decile schools).

At both year levels, teachers at high decile schools were the most lik ly repo t using individual programmes 'every day or almost every day' (28 percent compared with 16 and 21 percent at Year 4 and 32 percent compared with 14 and 26 percent at Year 8 for teache s from high, mid and low decile schools respectively).

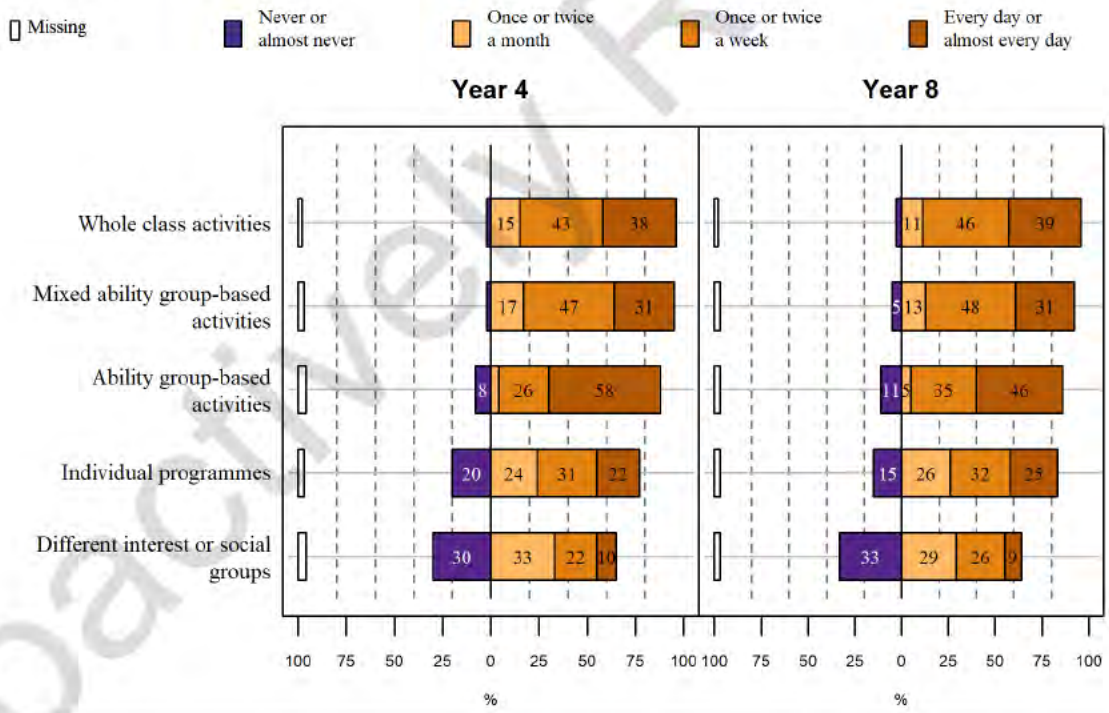


Figure 4.16 Percentage of teachers' responses about organisational strategies they use in mathematics, by year level

Opportunities to learn mathematics

Most teachers agreed that students experience a wide range of learning opportunities in mathematics, however there were differences related to school decile

Teachers were presented with a series of statements that described different learning opportunities in mathematics. They were asked to indicate how often students in their class had each experience in mathematics at school (Figure 4.17). Most teachers indicated that each one happened at least 'sometimes', with the exception of using calculators at Year 4.

There were differences in teachers' reports of calculator use associated with school decile. At Year 4 70 percent of teachers at low decile schools reported their students 'never or almost never use calculators, compared with 45 percent of teachers at high decile schools. At Year 8, 28 percent of teachers at low decile schools gave this response, compared with 13 percent of those at high decile schools. Seventy-seven percent of teachers at low decile schools indicated their students use a digital device or the internet to learn or practise mathematics at least 'once or twice a week . T is wa lower than the 87 percent of teachers at mid decile schools and 89 percent of teachers at high de ile schools who gave this response.

Also, at Year 4, half the teachers at low decile schools reported their tude t expl ined their way of solving a problem to other students or the teacher 'every day or almost ev ry day , compared with two thirds of teachers at high decile schools.

Year 8 teachers at high and mid decile schools were less likely han hose at low decile schools to indicate their students write maths problems for their peers to solve a least 'once or twice a week' (17 and 26 percent, at high and mid decile, respectively, compared with 42 percent for those at low decile schools).

At Year 8, teachers at mid and high decile schools wer also less likely than those at low decile schools to indicate their students construct tables or graphs at least 'once or twice a week' (30 and 32 percent at mid and high decile schools, resp ctive y, compared with 46 percent of those at low decile schools).

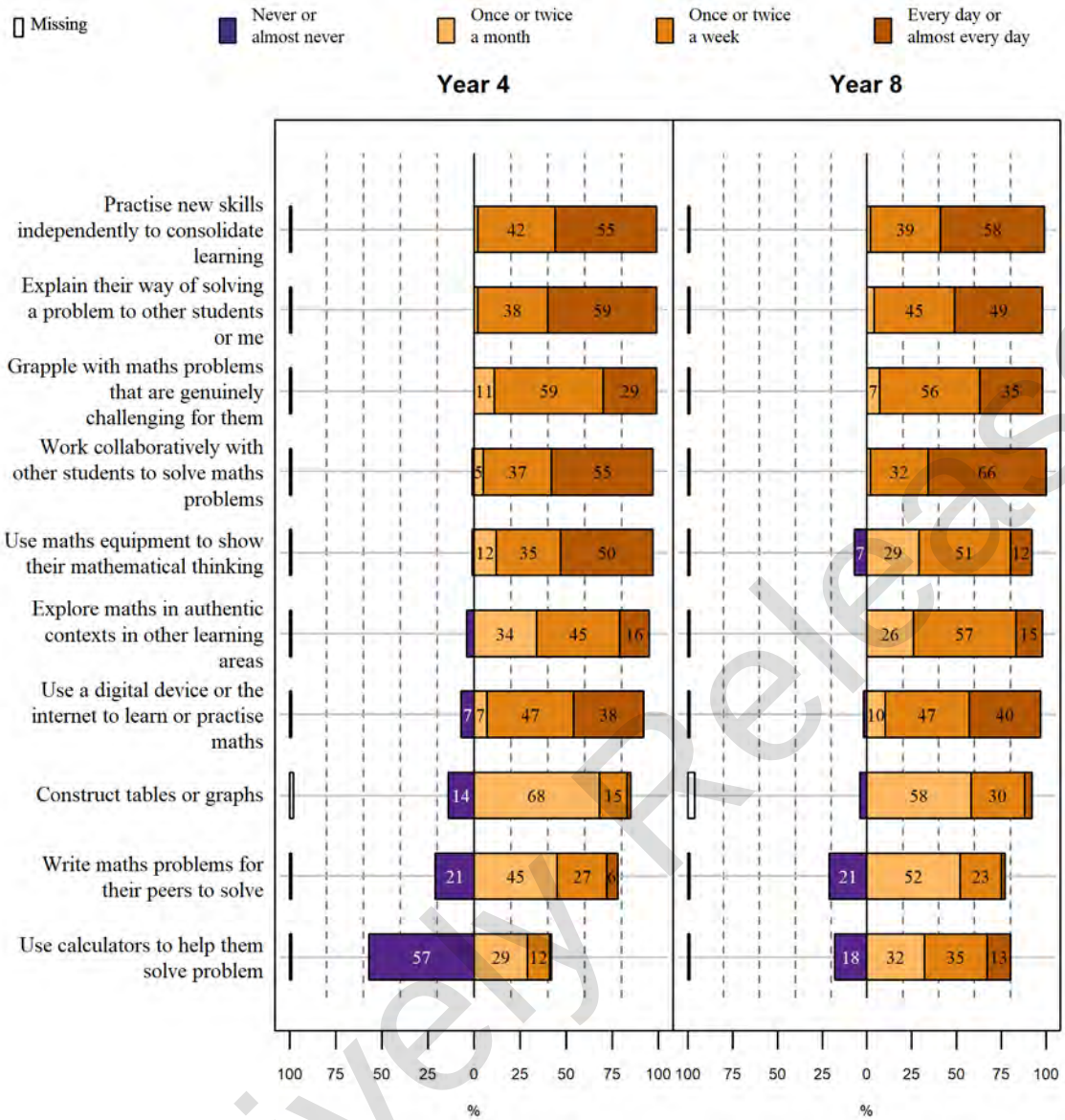


Figure 4.17 Percentage of teach rs' respo s regarding opportunities for students to learn mathematics, by year level

Most of the learning oppor unities rated by the teachers were either the same or similar to ones that were rated by s udents (Figure 4.7). Overall, teachers tended to indicate that the students in their classes exper nced each of the learning opportunities somewhat more often than the students themselve indi ated hat they were involved in each one. Typically, students were more likely than teacher to res ond 'never' to each statement. Year 4 students indicated slightly more frequent use of calculator than was reported by teachers.

The bi gest difference between students' and teachers' responses to the statements involved i dications of how often students construct tables or graphs (the parallel statement in the student questionnaire was 'make graphs or tables'). Forty-two percent of Year 4 students indicated they did this at least 'once or twice a week', as did 55 percent of Year 8 students. In comparison, 17 percent of Year 4 teachers and 34 percent of Year 8 teachers reported their students doing this with the same frequency.

Resourcing and professional learning and development in mathematics

Most teachers agreed that they had access to adequate resources for teaching mathematics

Overall, the majority of teachers indicated that they had access to the necessary resources to support the learning of all students in mathematics (Figure 4.18). However, 16 percent at Year 4, and 19 percent at Year 8, did not agree.

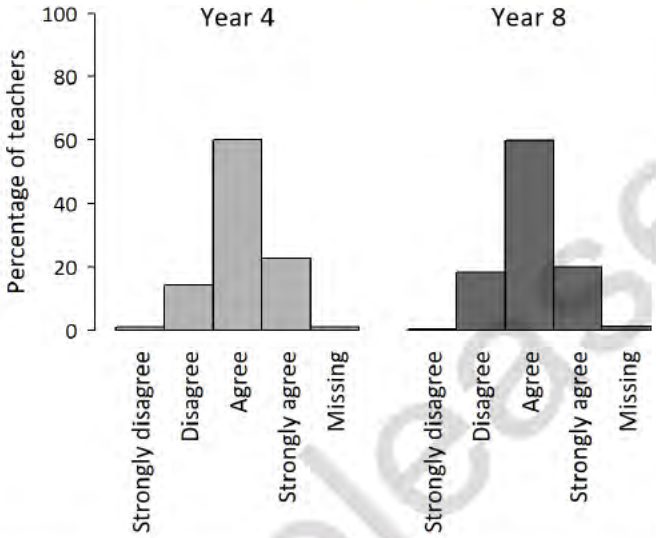


Figure 4.18 Perce ge of a hers' esponses regarding access to res urces o sup ort th learning of all students in mathema cs, by year level

Most teachers indicated that they had participa ed in professional learning and development in mathematics education le s than two years ago

Around two thirds of teachers at both Year 4 and Year 8 reported that they had participated in PLD in mathematics education less than two years ago (Figure 4.19). Small gro ps f teachers indicated tha the last time they had this kind of PLD was either more than five ye rs ago or that they had never had this (9 p rce t of Year 4 teachers and 14 percent of Y ar 8 teachers).

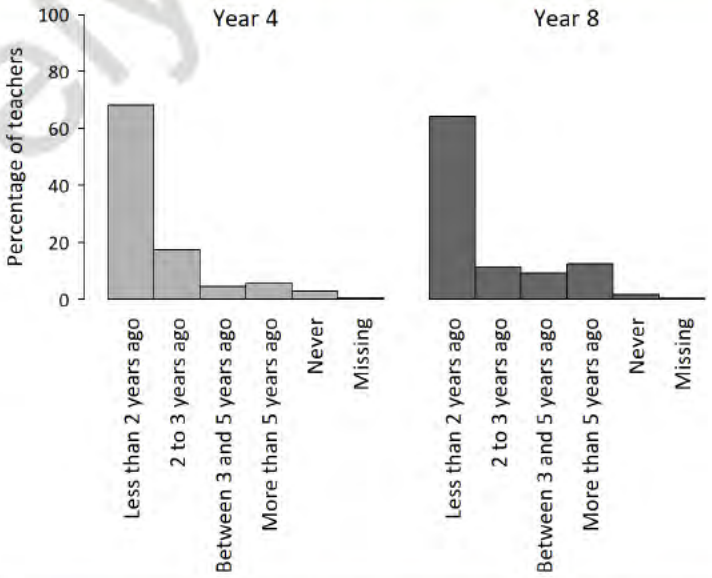


Figure 4.19 Percentage of teachers' responses regarding when they last had professional learning and development in mathematics education, by year level

Looking back

In 2013, about 80 percent of all teachers reported that they had participated in PLD in mathematics teaching less than two years ago. This included around 70 percent who reported having PLD within the past 12 months.

Many teachers reported infrequent opportunities for observing a colleague teaching mathematics

Teachers were asked how often they were involved in four types of professional interactions with colleagues about teaching mathematics (Figure 4.20). Discussions about teaching and assessing mathematics learning were happening at least monthly for over half the teachers at each year level. Of the four types of interaction, observing a colleague was the least frequent, by a substantial margin.

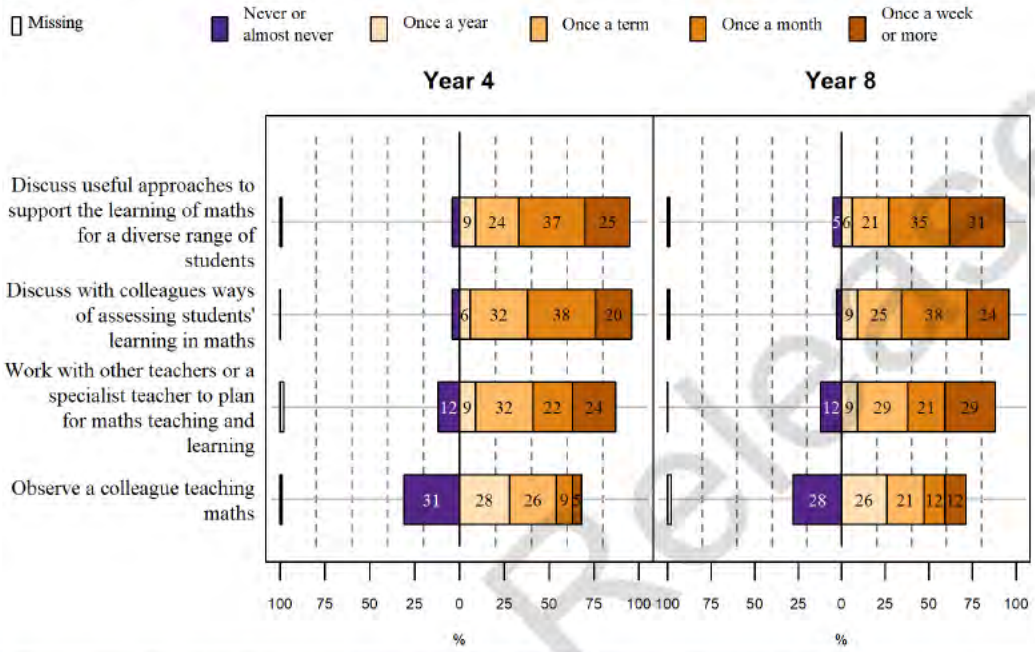


Figure 4.20 Percentage of teachers' responses regarding how often th y have professional interactions about teaching and learning mathematics, by year level

About half of all teachers rated th ir p ofess onal support for teaching mathematics as 'good' or 'very good'

Teachers were asked to provide an overall rating for the professional supp rt they received. This me fter questions rel ted to PLD and prof ssio al support networks w thin the school. Around half o the teachers at ea h year level (52 percent at Year 4 and 49 per nt at Year 8) rated the professional support they receive for teaching mathematics as 'good' or 'very good'. Fifteen percent of Year 4 teachers and 18 percent of Year 8 teachers rated their professional support as 'poor' or 'very poor'.

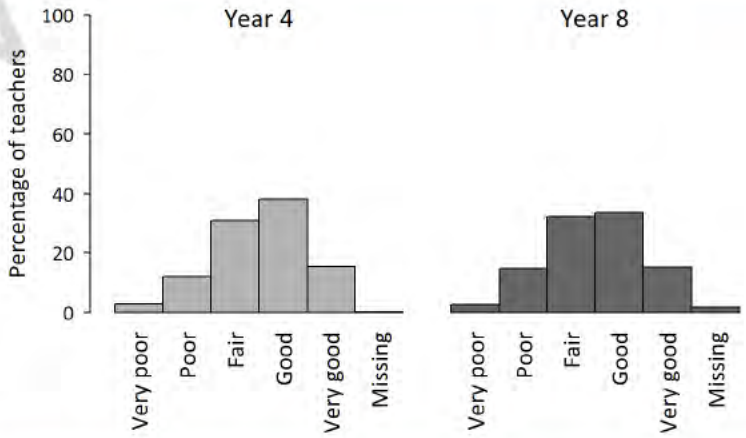


Figure 4.21 Teachers' ratings of the professional support they receive for teaching mathematics, by year level

3. Principals' perspectives on learning and teaching mathematics and statistics

All principals from the schools in the NMSSA mathematics and statistics study were asked to complete a principal questionnaire. Table 4.5 shows the percentage of principals by school decile band at Year 4 and Year 8.

Table 4.5 Percentage of principals who responded to the questionnaire, by school decile band and year level

	Percentage of Principals	
Decile band	**Year 4 (*N=93*)**	**Year 8 (*N=91*)**
Low	24	22
Mid	37	37
High	40	41

Principals were asked to identify what proportion of their students had English as a second language (Table 4.6). On average, principals from low decile schools reported a greater proportion of English as a second language (ESL) or alternative language (EAL) students compared with prin ipals f om mid and high decile schools. Thirteen percent of Year 4 principals and 30 percent of Year 8 principals from low decile schools indicated that their schools had over 50 percent ESL/EAL students.

Table 4.6 Percentage of principals responding to the question abou the p oport n of s udents in the school that have English as a second language (ESL) or alternative language (EAL) by response category

Percentage ESL/EAL	Year 4 (93)	Year 8 (91)
25% or less	72	71
26-50%	12	8
51-75%	3	6
76-90%	2	1
More than 90%	1	1
No response	10	13

The school's provision for mathematics

Most principals were positive about their school's overall provision for learning in mathematics

Four fifths of principals rated their school's provision f r learning in mathematic s either 'good' or 'very good' (F gure 4.22).

Overall principals at high decile s hool rated the provision for mathematics learning higher than principals at low decile schools. At high decile schools, 95 percent of Year 4 and 89 percent of Year 8 principals indicated 'good' or 'very good' provision. This compared to 82 percent and 70 percent, respectively, at low decile schools.

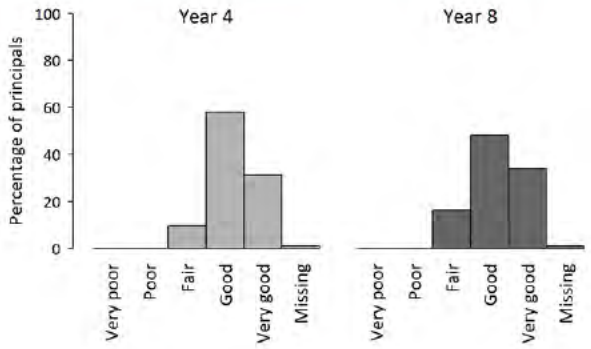


Figure 4.22 Percentage of principals' ratings of their school's overall provision for learning in mathematics, by year level

Most principals were generally positive about their school's curriculum planning, assessment and sharing of information related to mathematics

Principals were asked to rate how much each of a list of statements about curriculum planning, assessment and sharing information resembled what happened in their school (Figure 4.23). Most principals rated each of the statements as 'very like our school'. There was little difference between Year 4 and Year 8 principals' responses to the statements.

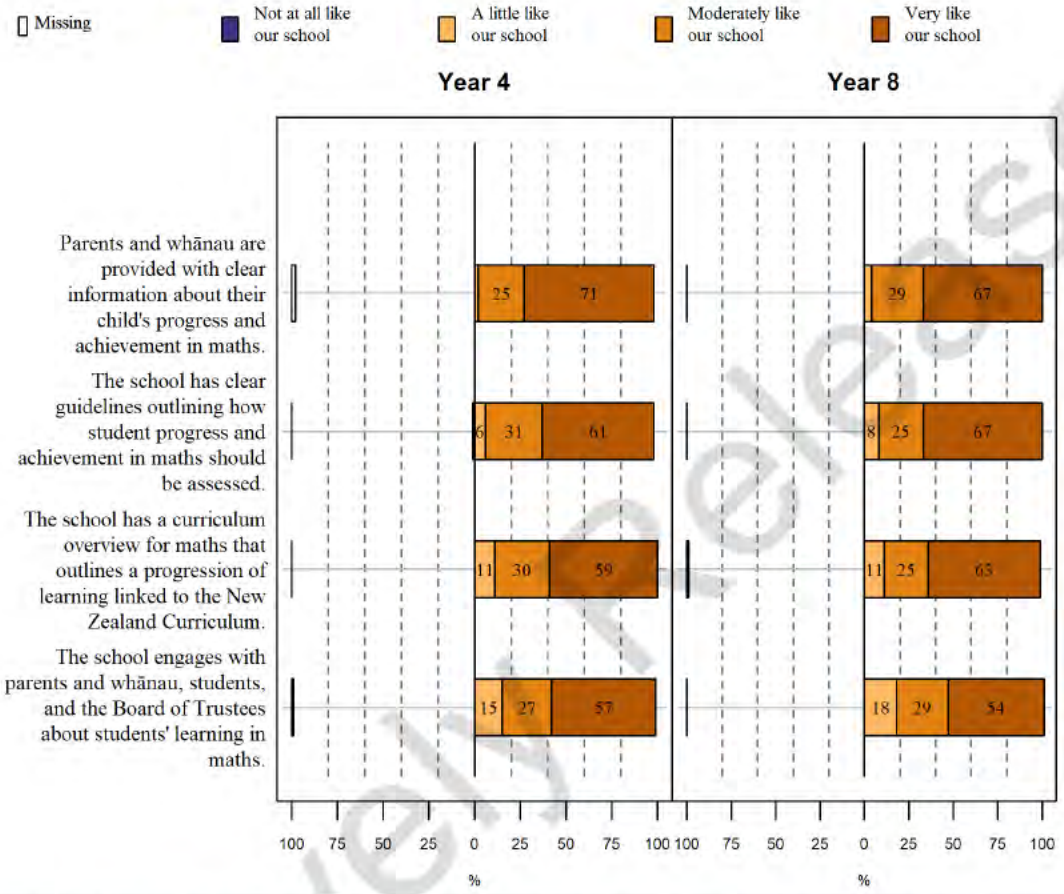
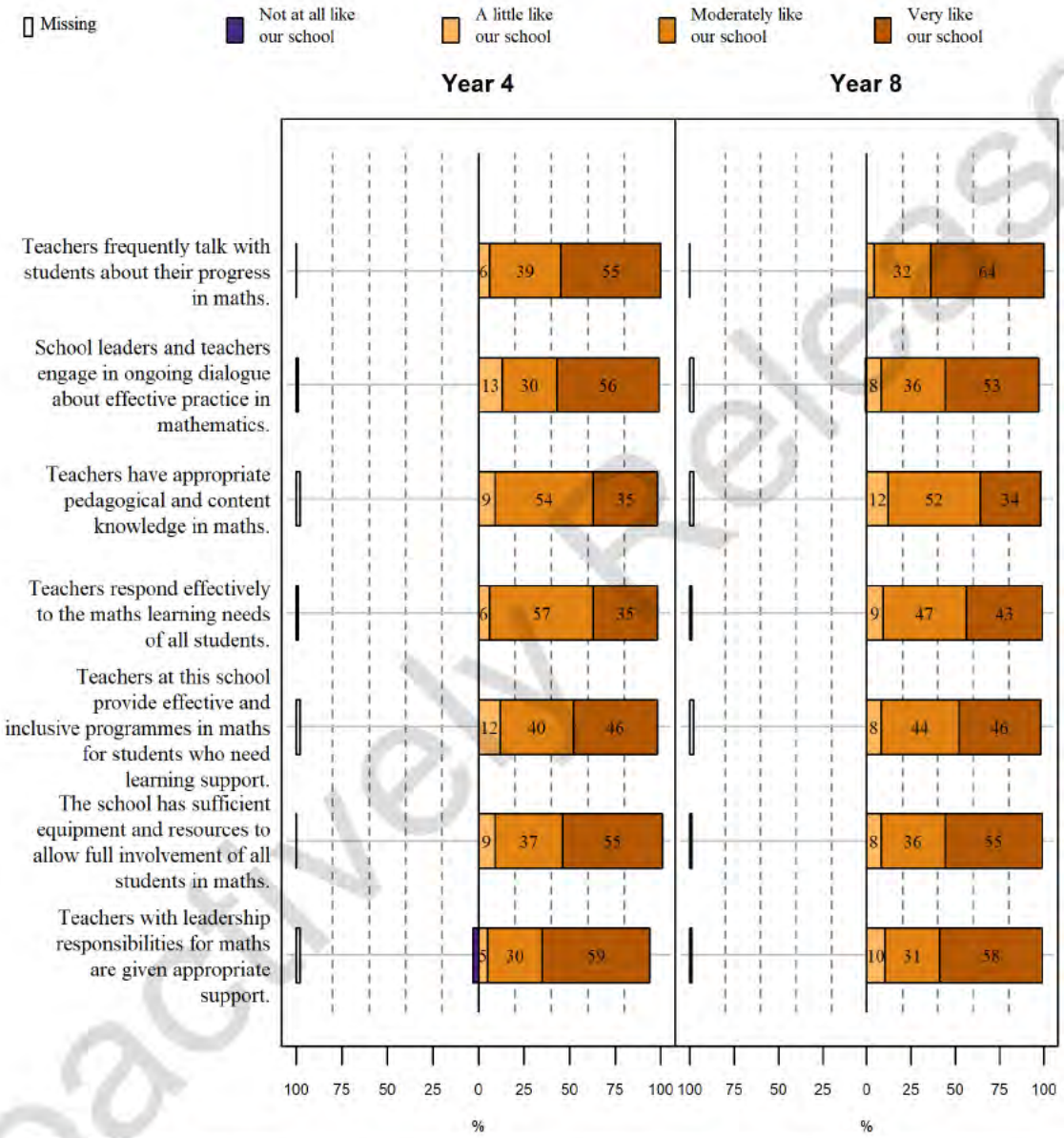


Figure 4.23 Percentage of pr ipals atings of statements related to school approaches to curriculum planning, assessment a d sharing i ormation for mathematics, by year level

Overall, principals were positive about the capabilities of teachers to deliver the mathematics curriculum

In general, principals at both year levels were positive about the capabilities of the teachers in their schools to deliver the mathematics curriculum (Figure 4.24). However, they rated statements about teachers' pedagogical and content knowledge in mathematics and ability to respond effectively to students' learning needs less positively than other statements.



F ure 4.24 Percentage of principals' ratings of statements related to school approaches to teaching and learning mathematics, by year level

Almost all mathematics programmes were delivered entirely or primarily by the classroom teacher

Mathematics and statistics programmes were predominantly delivered by classroom teachers or the classroom teacher with some specialist support (Figure 4.25). At Year 8, a very small proportion of programmes was delivered mainly by a specialist teacher with some support from the classroom teacher or entirely by the specialist teacher.

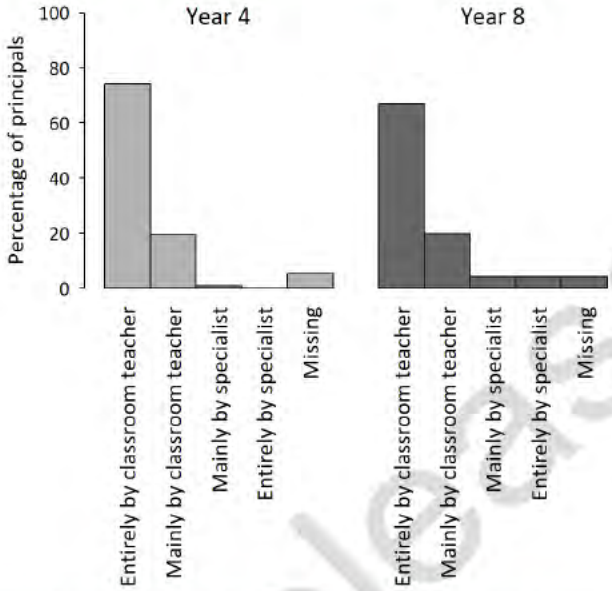


Figure 4.25 Percentage of pr ncipa responses regarding how math tics a d tatist s programme was delivered in heir sc ool, by year evel

Kāhui Ako

About two thirds of principals reported tha their school was part of a Kāhui Ako/Community of Learning

About two thirds of principals reported th t their schools were a part of Kāhu Ako (Figure 4.26).

Half of the principals who id ntified they were part of a Kāhui Ako ind cated that their Kāhui Ako had achievem nt ch llenges for mathematics and st tistics tha involved Year 4 and/or Year 8 stu ents.

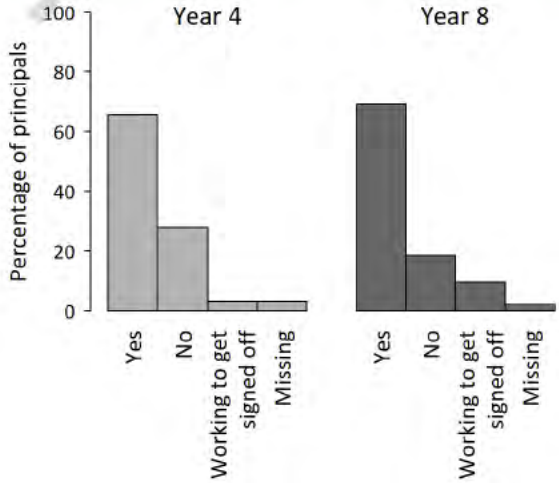


Figure 4.26 Percentage of principals' responses regarding whether their school was part of a Kahui Ako/Community of learning, by year level

Professional support for teaching maths

Most principals indicated that teachers had moderate to extensive access to external professional learning and development in mathematics

Principals were asked about the PLD in mathematics in their school and whether mathematics had been a professional learning focus in the last five years (Figure 4.27). At both Year 4 and 8, approximately 80 percent of principals indicated that teachers had 'extensive' or 'moderate' access to professional learning in mathematics.

At Year 4, a greater proportion of principals from mid and high decile schools indicated little or no access to PLD compared with principals from low decile schools (5 percent of principals of low decile schools indicated little or no access to PLD in mathematics compared with 29 percent of mid decile schools, and 22 percent of high decile schools.)

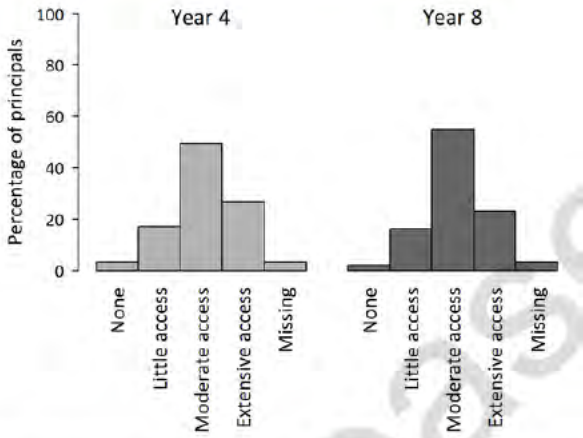


Figure 4.27 Percentage f prin pal res onses regarding access to prof sion learni g and development, by ear le el

Mathematics had been a focus for development for most schools in the last five years

Over half of the principals reported that mathematics had been a maj focus for development in the last five years. At least another third indica ed it had been a minor focus (Figure 4.28).

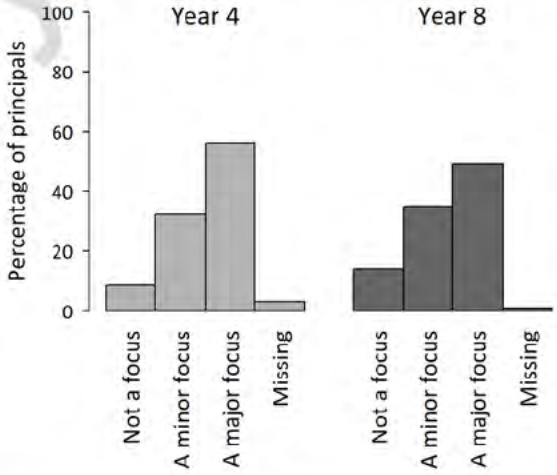


Figure 4.28 Percentage of principals' responses regarding whether mathematics had been a focus for development in the last 5 years, by year level

Appendix: Summary Statistics

Tables:

Notes:

Reporting of statistics

The following tables report a range of statistics associated with the 2018 NMSSA Mathematics study. Statistics for a population subgroup are not presented when the subgroup is represented by fewer than 42 students.

95% confidence intervals

The tables show the 95 percent confidence intervals associated with the mean scores and the differences between mean scores reported in the tables. The intervals provide a range within which we can be fairly sure the population value for the reported statistic lies. The confidence intervals have been adjusted (widened) to account for any design effect associated with NMSSA's sampling approach (i.e. sampling schools and then sampling students).

Effect sizes

Effect sizes are also reported in the following tables of statistics. An effect size quan ifie th difference between the average scores for two groups in terms of standard deviation unit Beca se the standard deviation can vary from group to group, this can mean that the same differe ce in scale scores can be associated with a different effect size for one pair of groups compared with noth r. When comparing two effect sizes it is very important to refer back to the scale score differences to m ke sure any interpretations are valid.

The formula for the effect size calculation is: $\frac{M \quad M_2}{\sqrt{\frac{(n \; - \;)s^2 + (n \quad)s_2^2}{n \; + n_2 - 2}}}$, wh re M1 d M2 represent the average

scores for group 1 and group 2, s1 and s2 their standard deviations and n1 and n2 the number in each group.

Table A1.1 Achievement on the MS scale: Summary statistics for Year 4 students

Group	Sample size	Mean	Confidence interval for the mean	Standard deviation
All	2105	83.9	(82.9 , 84.9)	19.3
Gender				
Girls	1035	82.5	(81.1 , 83.9)	19.0
Boys	1070	85.2	(83.8 , 86.6)	19.5
Ethnicity				
Māori	439	75.2	(73.1 , 77.3)	18.3
Pacific	287	71.1	(68.6 , 73.6)	18.3
Asian	263	91.4	(88.8 , 94.0)	18.1
NZE	1328	87.5	(86.3 , 88.7)	18 0
Special education needs				
SEN (combined)	180	68.4	(65.4 , 71.4)	7 1
Decile band				
Low decile	483	71.6	(69.6 , 73.6)	18.7
Mid decile	772	83.3	(81.8 , 84.8)	18.0
High decile	850	91.4	(90.0 , 92 8)	17.1
School type				
Contributing	1354	83.3	(82 1 , 84)	19.4
Full primary	696	84.8	(8 86 5)	19.1
Composite (Year 1-15)	55	86.6	(80.2 , 93.0)	19.5

Table A1.2 Achievement on the MS scale: Summary s atistics for Year 8 students

Group	Sample size	M an	Co fidence interval for the mean	Standard deviation
All	1985	117.1	(116.0 , 118.2)	20.7
Gender				
Girls	949	116	(114.6 , 117.6)	19.8
Boys	1036	118.0	(116.4 , 119.6)	21.4
Ethnicity				
Māori	448	108.3	(106.3 , 110.3)	18.4
Pacific	245	105.6	(102.8 , 108.4)	18.5
Asian	256	127.0	(123.8 , 130.2)	21.7
NZE	1222	119.5	(118.2 , 120.8)	19.4
Special educa ion ee s				
SEN (combin d)	89	101.0	(96.8 , 105.2)	16.7
Deci e band				
Low decile	425	105.7	(103.6 , 107.8)	18.6
Mid decile	739	116.0	(114.3 , 117.7)	19.9
igh decile	821	124.0	(122.4 , 125.6)	19.6
School type				
Composite	82	112.3	(106.8 , 117.8)	20.8
Full primary	749	117.3	(115.5 , 119.1)	20.4
Intermediate	858	116.2	(114.5 , 117.9)	21.1
Restricted composite	44	121.5	(114.4 , 128.6)	19.3
Secondary	252	120.2	(117.2 , 123.2)	19.9

Table A1.3 Achievement on the MS scale: Differences between subgroup means for Year 4 students

Subgroup 1	Sample size subgroup 1	Subgroup 2	Sample size subgroup 2	Difference in means*	CI for the difference in means	Effect size
Gender						
Girls	1035	Boys	1070	**2.7**	(1.3 , 4.1)	0.14
Ethnicity						
Māori	439	Non-Māori	1666	**11.0**	(9.4 , 12.6)	0.58
Pacific	287	Non-Pacific	1818	**14.8**	(12.9 , 16.7)	0.79
Asian	263	Non-Asian	1842	**-8.6**	(-10.6 , -6.6)	-0 5
NZE	1328	Non-NZE	777	**-9.8**	(-11.2 , -8.4)	0.52
Special education needs						
SEN	180	No SEN	1925	**16.9**	(14.7 , 1 .1)	0 0
Decile band						
Low decile	483	Mid decile	772	**11.7**	(9.9 13.5	0.64
Low decile	483	High decile	850	**19.8**	(8.1 , 21.5)	1.12
Mid decile	772	High decile	850	**8.1**	(6.7 , 9.5)	0.46
School type						
Contributing	1354	Full primary	696	5	(0.0 , 3.0)	0.08

* Differences in means in bold font are statistically significant

Table A1.4 Achievement on the MS scale: Differences betwe n subgroup means for Year 8 students

Subgroup 1	Sample size subgroup 1	Subgroup 2	Sample size ubgroup 2	Difference in means*	CI for the difference in means	Effect size
Gender						
Girls	949	Boys	1036	**1.9**	(0.4 , 3.4)	0.09
Ethnicity						
Māori	448	Non Māor	1740	**13.1**	(11.0 , 15.2)	0.65
Pacific	245	N P cific	1729	**-11.4**	(-13.8 , -9.0)	-0.56
Asian	6	Non-Asian	763	**-6.3**	(-7.9 , -4.7)	-0.31
NZE	1222	Non-NZE	1852	**16.9**	(13.9 , 19.9)	0.83
Special education needs						
SEN (comb ned)	9	No SEN	1852	**16.9**	(13.9 , 19.9)	0.83
Decile band						
Low dec	425	Mid decile	739	**10.3**	(8.4 , 12.2)	0.53
L w decile	425	High decile	821	**18.3**	(16.4 , 20.2)	0.95
Mid decile	739	High decile	821	**8.0**	(6.4 , 9.6)	0.41
Sch ol type						
Full primary	749	Intermediate	858	**-1.1**	(-2.8 , 0.6)	-0.05
Full primary	749	Secondary (Year 7-15)	252	**2.9**	(0.5 , 5.3)	0.14
Intermediate	858	Secondary (Year 7-15)	252	**4.0**	(1.6 , 6.4)	0.19

* Differences in means in bold font are statistically significant

Table A1.5 Achievement on the MS scale: Differences between means for Year 4 and Year 8 by subgroup

Group	Year 4 sample size	Year 8 sample size	Year 8–Year 4 difference in means	CI for difference in means	Effect size
All	2105	1985	33.2	(32.2 , 34.2)	1.66
Gender					
Girls	1035	949	33.6	(32.1 , 35.1)	1.73
Boys	1070	1036	32.8	(31.3 , 34.3)	1.60
Ethnicity					
Māori	439	448	33.1	(31.1 , 35.1)	1.8
Pacific	287	245	34.5	(31.8 , 37.2)	1.88
Asian	263	256	35.6	(32.7 , 38.5)	78
NZE	1328	1222	32.0	(30.8 , 33 2)	1 71
Special education needs					
SEN (combined)	180	89	32.6	(28.4 , 6.8)	1.92
Decile band					
Low decile	483	425	34.1	(32.0 , 36.2)	1.83
Mid decile	772	739	32.7	(31.1 , 34.3)	1.73
High decile	850	821	32.6	(31.1 , 34.1)	1.77

Table A1.6 Curriculum levels: Year 4 students

Group	S mple size	Level 2 (%)	CI (%)	Level 2 (%)	CI (%)	Level 3 (%)	CI (%)	Level 4+ (%)	CI (%)
All	2105	18.8	(16.1 , 21.8)	43.1	(39.5 , 46.7)	34.9	(31.5 , 38.5)	3.2	(2.1 , 4.7)
Gender									
Girls	1035	20.3	(16.5 , 24.8)	44.2	(39.1 , 49.4)	33.0	(28.3 , 38.1)	2.4	(1.3 , 4.6)
Boys	1070	17 4	(13.8 , 21.6)	42.0	(37.1 , 47.1)	36.8	(32.0 , 41.8)	3.9	(2.3 , 6.4)
Ethnicity									
Māori	439	32.2	(25 3 40.	46.7	(38.9 , 54.7)	20.0	(14.4 , 27.1)	1.0	(0.3 , 4.3)
Pacific	287	41.4	(32.2 1.2)	43.0	(33.6 , 52.8)	15.2	(9.4 , 23.5)	0.5	(0.1 , 4.6)
Asian	263	9.2	(4 8 , 16 9)	36.2	(27.1 , 46.5)	49.6	(39.5 , 59.7)	5.0	(2.1 , 11.6)
NZE	1328	12.2	(9.5 , 15 6)	43.4	(39.0 , 48.0)	40.4	(36.0 , 45.0)	3.9	(2.5 , 6.1)
Special education needs									
SEN combined	180	46.8	(34.9 , 59.0)	43.0	(31.4 , 55.3)	10.0	(4.7 , 20.0)	0.2	(0.0 , 6.3)
Decile band									
Low decile	483	40.8	(33.6 , 48.4)	42.5	(35.2 , 50.1)	15.9	(11.1 , 22.2)	0.8	(0.2 , 3.7)
Mid decile	772	18.1	(13.9 , 23.1)	46 5	(40.6 , 52.5)	33.1	(27.7 , 39.0)	2.3	(1.1 , 5.0)
High decile	850	7.0	(4.6 , 10.5)	4 .3	(34.9 6.1)	47.4	(41.7 , 53.1)	5.3	(3.2 , 8.4)
School type									
Composite	1354	17.2	(6.3 , 39.2)	36.7	(19.0 58.8)	41.5	(22.6 , 63.2)	4.6	(0.7 , 23.8)
Contributing	696	19.9	(16.5 , 23.8)	42.7	(38.3 47.3)	34.4	(30.3 , 38.9)	2.9	(1.8 , 4.9)
Full primary	55	16.9	(12.7 , 22.1)	44.3	(38. , 50)	35.4	(29.6 , 41.6)	3.5	(1.8 , 6.6)

Table A1.7 Curriculum levels: Year 8 students

Group	Sample siz	< Level 2 (%)	CI (%)	Level 2 (%)	CI (%)	Level 3 (%)	CI (%)	Level 4+ (%)	CI (%)
All	1 85	0.3	(0.1 , 1.0)	8.5	(6.7 , 10.9)	46.6	(42.9 , 50.3)	44.6	(40.9 , 48.4)
Gender									
Girls	949	0	(0.1 , 1.8)	8.2	(5.7 , 11.7)	49.0	(43.7 , 54.4)	42.4	(37.1 , 47.8)
Boys	1036	0.2	(0.0 , 1.4)	8.8	(6.3 , 12.2)	44.3	(39.3 , 49.5)	46.7	(41.5 , 51.8)
Ethnicity									
Māori	448	0 5	0.1 , 3.3)	15.0	(10.2 , 21.4)	57.8	(50.0 , 65.4)	26.7	(20.3 , 34.2)
Pacific	245	0.7	(0 , 5.5)	19.1	(12.1 , 28.7)	56.6	(46.0 , 66.7)	23.6	(15.8 , 33.7)
Asian	256	0.1	(0.0 4.4)	3.0	(1.0 , 9.0)	35.4	(26.2 , 45.8)	61.5	(51.0 , 70.9)
NZE	1222	0.1	(0 0 , 1.2)	5.4	(3.7 , 8.0)	44.9	(40.2 , 49.6)	49.5	(44.8 , 54.3)
Special education needs									
SEN (combined)	89	0.7	(0.0 , 12	25.5	(13.4 , 43.1)	61.3	(43.7 , 76.3)	12.5	(4.9 , 28.5)
Decile band									
Low decile	425	0.8	(0.2 , 3.9)	19	(14.0 , 26.8)	56.4	(48.3 , 64.2)	23.1	(17.0 , 30.6)
Mid decile	739	0.2	(0.0 , 1.9)	8 0	(5.2 , 12.0)	50.7	(44.6 , 56.8)	41.1	(35.3 , 47.3)
High decile	821	0.1	(0.0 , 1.4)	.3	(1 8 6.1)	37.8	(32.3 , 43.6)	58.9	(53.0 , 64.4)
School type									
Composite	82	0.2	(0.0 , 12.3)	14.1	(5 6 , 31.	48.9	(31.7 , 66.3)	36.8	(21.6 , 55.2)
Full primary	749	0.3	(0.0 , 2.0)	8.0	(5 , 12.0)	46.9	(40.9 , 53.0)	44.8	(38.8 , 50.9)
Intermediate	858	0.3	(0.1 , 1.8)	9.8	(6 9 , 13)	46.7	(41.1 , 52.4)	43.2	(37.6 , 48.9)
Restricted composite	44	0.0	(0.0 , 20.2)	3.4	(0.4 , 5.2)	.5	(22.5 , 67.2)	53.1	(30.0 , 74.9)
Secondary	252	0.1	(0.0 , 4.4)	4.9	(1.9 , 11 6)	45.0	(34.9 , 55.4)	50.1	(39.8 , 60.4)

Table A1.8 Achievement on the MS scale: Summary statistics for Year 4 Māori students

Group	Sample size	Mean	Confidence interval for the mean	Standard deviation
All	439	75.2	(73.1 , 77.3)	18.3
Gender				
Girls	217	73.0	(70.0 , 76.0)	18.7
Boys	222	77.3	(74.5 , 80.1)	17.6
Decile band				
Low decile	174	67.5	(64.5 , 70.5)	16.5
Mid decile	183	78.7	(75.6 , 81.8)	17.8
High decile	82	83.7	(79.3 , 88.1)	16 6
School type				
Contributing	277	75.3	(72.7 , 77.9)	18.2
Full primary	143	74.5	(70.9 , 78.1)	18.4

Table A1.9 Achievement on the MS scale: Summary statistics for Year 8 Māo i stud nts

Group	Sample size	Mean	Confidence interval for the mean	Standard deviation
All	448	10 .3	(106.3 , 110.3)	18.4
Gender				
Girls	192	107.9	(104.8 , 111.0)	18.0
Boys	256	108.6	(105.8 , 111.4)	18.8
Decile band				
Low decile	165	102.2	(99.1 , 105.3)	16.8
Mid decile	80	107.5	(104.5 , 110.5)	17.0
High decile	103	119.4	(115.0 , 123.8)	18.6
School type				
Full primary	139	111.1	(107.0 , 115.2)	20.2
Intermediate	223	106.5	(103.8 , 109.2)	16.9
Secondary	53	111.5	(105.2 , 117.8)	18.9

Table A1.10 Achievement on the MS scale: Differences between subgroup means for Year 4 Māori students

Subgroup 1	Sample size subgroup 1	Subgroup 2	Sample size subgroup 2	Difference in means*	CI for the difference in means	Effect size
Gender						
Girls	217	Boys	222	**4.3**	(1.4 , 7.2)	0.24
Decile band						
Low decile	174	Mid decile	183	**11.2**	(8.2 , 14.2)	0.65
Low decile	174	High decile	82	**16.2**	(12.5 , 19.9)	0.98
Mid decile	183	High decile	82	**5.0**	(1.3 , 8.7)	0. 9
School type						
Contributing	277	Full Primary	143	**-0.8**	(-3.9 , 2.3)	-0.0

* Differences in means in bold font are statistically significant

Table A1.11 Achievement on the MS scale: Differences between subgroup means fo Ye r 8 Māo i students

Subgroup 1	Sample size subgroup 1	Subgroup 2	Sample size subgroup 2	Diffe ence in mea *	CI for he difference in means	Effect size
Gender						
Girls	192	Boys	256	0.7	(-2.2 , 3.6)	0.04
Decile band						
Low decile	165	Mid decile	1 0	**5.3**	(2.3 , 8.3)	0.31
Low decile	165	High decile	103	**17.2**	(13.5 , 20.9)	0.98
Mid decile	180	High decile	103	**11.9**	(8.2 , 15.6)	0.68
School type						
Full primary	139	nter ediat	223	**-4.6**	(-8.0 , -1.2)	-0.25

* Differences in means in bold font are statistically gnif ant

Table A1.12 Achievement on th MS s ale: Differences between means for Year 4 and Year 8 Māori by subgroup

Group	Year 4 sample size	Year 8 sample size	Year 8–Year 4 difference in means	CI for difference in means	Effect size
All	439	448	33.1	(31.1 , 35.1)	1.80
Gender					
Girls	217	192	34.9	(31.8 , 38.0)	1.90
B ys	222	256	31.3	(28.7 , 33.9)	1.71
Dec e band					
Low decile	174	165	34.7	(31.7 , 37.7)	2.08
Mid decile	183	180	28.8	(25.8 , 31.8)	1.65
High decile	82	103	35.7	(31.6 , 39.8)	2.01

Table A1.13 Achievement on the MS scale: Summary statistics for Year 4 Pacific students

Group	Sample size	Mean	Confidence interval for the mean	Standard deviation
All	287	71.1	(68.6 , 73.6)	18.3
Gender				
Girls	142	71.0	(67.3 , 74.7)	18.8
Boys	145	71.3	(67.8 , 74.8)	17.9
Decile band				
Low decile	199	67.9	(65.0 , 70.8)	17.6
Mid decile	64	77.4	(72.1 , 82.7)	17.5
School type				
Contributing	220	70.3	(67.4 , 73.2)	18.4
Full primary	65	73.7	(68.3 , 79.1)	18.2

Table A1.14 Achievement on the MS scale: Summary statistics for Year 8 Pacific students

Group	Sample size	Mean	Confidence terval for t e mea	Standard deviation
All	245	105.6	(102.8 , 108.4)	18.5
Gender				
Girls	107	104.8	(100.7 , 108.9)	17.9
Boys	138	0 .3	(102.5 , 110.1)	19.0
Decile band				
Low decile	141	100.0	(96.6 , 103.4)	16.9
Mid decile	68	110.9	(106.0 , 115.8)	16.7
School type				
Full primary	104	108.3	(103.7 , 112.9)	19.7
Intermediate	1 3	102.5	(98.8 , 106.2)	17.2

Table A1.15 Achievement on the MS scale: Differences between subgroup means for Year 4 Pacific students

Subgroup 1	Sample size subgroup 1	Subgroup 2	Sample size subgroup 2	Difference in means*	CI for the difference in means	Effect size
Gender						
Girls	142	Boys	145	0.3	(-3.3 , 3.9)	0.02
Decile band						
Low decile	199	Mid decile	64	**9.5**	(5.3 , 13.7)	0.54
School type						
Contributing	220	Full Primary	65	3.4	(-0.8 , 7.6)	0.19

* Differences in means in bold font are statistically significant

Table A1.16 Achievement on the MS scale: Differences between subgroup means for Year 8 Pacific students

Subgroup 1	Sample size subgroup 1	Subgroup 2	Sample size subgroup 2	Difference in means*	CI for t e difference i mea s	Effect size
Gender						
Girls	107	Boys	138	1.5	(-2.4 , 5.4)	0.08
Decile band						
Low decile	141	Mid decile	68	**1 9**	(6.8 , 15.0)	0.65
School type						
Full primary	104	Intermediate	123	**-5.8**	(-9.9 , -1.7)	-0.32

* Differences in means in bold font are statistically significant

Table A1.17 Achievement on the MS scale: Differe ces between means for Year 4 and Year 8 Pacific students by subgroup

Group	Year 4 sample size	Year 8 samp e size	Year 8–Year 4 difference in means	CI for difference in means	Effect size
Gender					
Girls	142	107	33.8	(29.7 , 37.9)	1.84
Boys	145	138	35.0	(31.3 , 38.7)	1.90
Decile band					
Low decile	1 9	141	32.1	(28.7 , 35.5)	1.85
Mid decile	64	68	33.5	(28.6 , 38.4)	1.96

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Wānangatia te Putanga Tauira
National Monitoring Study
of Student Achievement

Social Studies
2018 – Key Findings

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Key reports for Social Studies 2018
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20: Social Studies 2018 – Key Findings
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Executive Summary

Introduction

The National Monitoring Study of Student Achievement (NMSSA) is designed to assess student achievement across the New Zealand Curriculum[1] (NZC) at Year 4 and Year 8 in English-medium state and state-integrated schools. The study is organised in five-year cycles. The first cycle ran from 2012 to 2016.

In 2018, NMSSA assessed social studies achievement using a nationally representative sample of about 1 200 students at each year level. A two-stage sampling design was used to construct each sample. In the first stage, a stratified random sampling approach that took into account school decile, geographical regi n and school size was used to select 100 schools at each year level. In the second stage, a maximum of 12 students were randomly selected from each school to take part in the study[2]. Results were report d on me urement scale called the Nature of Social Studies (NSS). Questionnaires were also used o gat er cont xtual information from students, teachers and principals.

NMSSA last assessed social studies in 2014. The 2014 and 2018 NSS mea urem nt scales were linked on the basis of assessment tasks that were used at both points in me. T i allowed results from the separate studies to be compared. The linking process involved re onstru ting the 2014 achievement distributions using the plausible values approach employed in 2018. This m ans th achievement statistics presented in this report vary from the statistics presented in the original 20 4 report.

This report is designed to provide a succinct overview of key findings from the 2018 social studies study, compare changes in student achievement since 201 and report on contextual factors. The report is supplemented by a report focused on curric lum in ights, a technical information report and an online interactive statistical application. All reports and the inte active application can be found on the NMSSA website (www.nmssa.otago.ac.nz).[3]

Key findings

Achievement in social st dies in 2018

The difference in average s ores between Year 4 and Year 8 indicates that students made about 10 scale score points of 'progress' per year between Year 4 and Year 8.

Seventy-three pe cent f students in Year 4 achieved level 2 curriculum expectations or higher, and 37 percent of Year 8 st den s a hieved level 4 curriculum expectations or higher.

There wer sta istically significant differences in average achievement related to gender, ethnicity, school deci e[4] and s hool type.

- Girls scored higher, on average, than boys by 4 and 8 scale score points at Year 4 and Year 8, respectively.
- At both year levels, the average score for Māori students was lower than non-Māori students by about 10 scale score points, which is roughly equivalent to one year of instruction.
- At both year levels, Pacific students scored lower, on average, than non-Pacific students by about 12 scale score points, which is roughly equivalent to one year of instruction.

[1] Ministry of Education. (2007). The New Zealand Curriculum. Wellington: Learning Media.

[2] Detailed information about the sampling process and the achieved sample can be found in *NMSSA Report 21 Technical Information 2018*.

[3] The curriculum insights report should be available early in 2020.

[4] The *low* decile band comprised students in decile 1 to 3 schools, the *mid* decile band, students in decile 4 to 7 schools and the *high* decile band, students in decile 8 to 10 schools.

- Students attending high and mid decile schools typically scored higher than those attending low decile schools. Students attending high decile schools scored higher, on average, than students from low decile schools by 18 scale score points at both year levels, which is roughly equivalent to two years of instruction.
- Year 8 students attending secondary schools scored higher, on average, than those attending full primary and intermediate schools by 4 and 5 scale score points, respectively.
- Students with special education needs scored lower, on average, than students with no special education needs by about 17 scale score points.

Change in achievement between 2014 and 2018

When comparing achievement in 2014 and 2018, we need to take into account two factors that ch nge in the assessment of NSS between these years. The changes related to differences in the method o ass ment used (a group-administered assessment was added in 2018) and the limited number of common items used to link the 2014 and 2018 NSS scales.

The percentage of Year 4 students achieving at curriculum level 2 or above increased i 2018 y 10 percentage points (from 63 percent in 2014 to 73 percent in 2018). The percentage of Year 8 students achieving at curriculum level 4 or above remained the same.

The overall average NSS score at Year 4 increased, while there was no change t Yea 8. Statistically significant increases in average achievement scores were recorded for several sub roups including: Year 4 girls, Year 4 Māori students, Year 4 Pacific students, Year 4 Asian studen s, and Year 4 and Year 8 students attending low decile schools. These increases ranged from 4 to 12 scale s ore points

Contextual factors associated with learning in socia studies

From students

Attitudes and confidence

Overall, students were positive and confident abou learning social studies at school. Year 8 students were less positive and less confident, on average, than Year 4 students.

Students who had more positive attitudes, n average, at both Year 4 and Year 8 were: girls, Pacific students, Asian students, and studen in l w and mid decile schools. Year 4 students attending contributing schools also had more positive attitudes

The level of confidence was imila across gender, ethnicity, school decile and school type.

Scores on both the Attitude to Social Studies and Confidence in Social Studies scales were positively but weakly associated with achievement on the NSS assessment. Achievement was more strongly related to confidence than attitude

Teaching nd arning

The majority of students indicated they experienced a range of learning opportunities in social studies 'often' r 've y often', such as, talking about the big ideas they are learning about, and using digital devices and the I ternet to learn new things. An exception was the large percentage of students who indicated they 'never' used digital devices or the Internet to connect with people outside school. The majority of students indicated they had experienced each element of the social inquiry approach 'often' or 'very often'.

Most students rated the difficulty of their social studies learning as 'about right for me'.

From teachers

Attitudes and confidence

Almost all teachers had positive attitudes about social studies, and most reported they were confident teaching it. They were also confident about teaching the conceptual strands, and teaching students to use a social inquiry approach.

Close to 20 percent of Year 4 teachers were not confident that they could effectively plan for and support students' individual learning needs in social studies, and about 20 percent of teachers at both levels felt 'unsatisfied' with their teaching.

Teaching and learning/resourcing

According to teachers at both year levels, digital devices are frequently used in social studies to access resource , and especially at Year 8, to explore new learning environments.

About 75 percent of teachers accessed TKI Social Studies Online to support their teaching of social studies

The majority of teachers (about 70 percent) agreed they had access to the necessary resource to support the learning of all students in social studies.

Professional support

Half of the teachers reported having received external professional learning an dev lopment (PLD) in social studies within the last five years.

Most teachers reported having professional interactions with c ll ague about t aching social studies at least twice a year. Only a minority of teachers observed a colleague teach ng soci l studies.

While up to a third of teachers rated the professional supp rt hey received as 'good' or 'very good', most teachers were less positive, rating it as 'fair' or 'poor'.

From principals

Teaching and learning/resourcing

The majority of principals reported that their sc ool had lear progressions of learning, guidelines outlining assessment strategies for student progres , and comprehen ive plan for social studies implementation.

Smaller proportions of principals rep rted heir s hool had processes for systematically collating and analysing information on student achievement to inform curriculum review and resourcing decisions in social studies, or had charter goals related to student l rn ng in social studies.

Overall, principals at both year levels were positive about the practices in their schools that support teaching and learning in social studies, nd were reasonably confident that their teachers provided effective programmes for their students.

Communication of achi ement and progress in social studies to parents and whānau, students and the Board of Trustees was rela ively limited.

Mos princ pals reported that their school was well resourced to allow all students to be fully involved in s ci l studie and that their school provided appropriate support for teachers with leadership responsibilities for soci l tudies.

Prof ssional support

Social studies had not been a focus for development in the last five years for over half of the schools.

Two thirds of principals at Year 4 and about half at Year 8 reported that teachers' had none or little access to PLD in social studies.

Two thirds of principals at Year 8 and about half at Year 4 rated their school's overall provision for students' learning in social studies as 'good' or 'very good'.

Changes in contextual findings between 2014 and 2018

Where contextual questions were the same or similar in 2014 and 2018, the patterns of responses were compared. Generally, the responses to comparable questions were similar, indicating that not many contextual variables had changed over the four-year period.

However, there were several exceptions.

A greater percentage of students in 2018 than in 2014 reported more frequent opportunities to 'make decisions in school about things that matter to them' (about 64 percent of Year 4 and Year 8 students in 2018 compared with about 53 percent in 2014) and to 'discuss their ideas with other people' (69 percent of Year 8 students in 2018 compared with 57 percent in 2014).

Year 4 teachers in 2018 were more confident about planning social studies lessons to match indiv dual students' needs than in 2014 (91 percent compared to 80 percent) but were less confident about having t necessary knowledge and skills to teach social studies to a diverse range of students (71 percent ompared to 86 percent).

Year 8 teachers in 2018 were more likely draw on students' backgrounds and experiences to support their learning in social studies than in 2014 (98 percent compared to 86 percent).

Conclusions

There was an increase in achievement between 2014 and 2018 for Year 4 students overall, for Year 4 Māori and Pacific students, and for Year 4 and Year 8 students in low decile school . There was no change for Year 8 students overall.

Several findings have been observed in almost all learning areas ss d by NMSSA:

- The majority of Year 4 students achieved at or above heir expected curriculum level (L2) but only a third of Year 8 students achieved at or above their expe ted curriculum level (L4).
- There were differences in achievement associa ed with ethnicity and school decile.
- Students generally had positive attitud s and c fidence in learning social studies, although Year 8 students were less positive than Ye r 4 st dents.
- For a majority of teachers, ther wa limited access to PLD, and many indicated that professional support was of limited quali y.

While the majority of teachers wer po itive and confident about teaching social studies, there was a sizable proportion of teachers w o rep ted a lack of confidence in providing an effective and inclusive social studies programme for all students n thei classes.

1 Introduction to the National Monitoring Study of Student Achievement

This chapter provides an overview of the purpose and features of the National Monitoring Study of Student Achievement (NMSSA), the focus for the 2018 study and the structure of the social studie key findings report.

1. National Monitoring in brief: purpose and features

NMSSA is designed to assess student achievement at Year 4 and Year 8 in N w Zealand English-medium state and state-integrated schools. The main purposes of NMSSA are to:

- provide a snapshot of student achievement against th N w Ze land Curriculum (NZC)
- identify factors that are associated with achievement
- assess strengths and weaknesses across the curricul m
- measure change in student achievement over time
- provide high-quality, robust information for policy makers, curriculum planners and educators.

NMSSA has a particular focus on Māori students, Pacific students and students with special education needs.

The study is carried out in five-year cycles. The results from the first cycle (2012–2016) set the baseline for measuring change in student achievement over me in subsequent cycles. The second cycle, which began in 2017, provides the first opportunity t me sur change in student achievement over time.

NMSSA designs and carries out tud es in up to two learning areas each year. The study includes an assessment of student pe formance and the collection of contextual information from students, teachers and principals to help us under tand the factors associated with students' achievement. In relation to specific learning areas, thi includes: students' attitudes and confidence, and opportunities to learn; teachers' confidence in teach ng the specific learning area and the learning experiences provided for students; and teachers' and prin ipals views of the learning and teaching programme in their school, and professional and curriculum upport provided for the learning area.

Advisory p nels of curriculum experts and a technical reference group provide support for the project.

2. The focus of the NMSSA study for 2018

The focus learning areas for the 2018 NMSSA study were social studies, previously assessed in 2014 of cycle 1, and mathematics and statistics[5], previously assessed in 2013. Nationally representative samples[6] of 1200 students from 100 schools at each of Year 4 and Year 8 took part in a group-administered assessment. A subset of 600 students took part in one-to-one tasks requiring oral and written responses and a subset of 800 students were involved in group-based activities.

Experienced, specially trained classroom teachers conducted the assessments during Term 3 (July to September 2018).

[5] The findings for mathematics can be found in *NMSSA Report 19 Mathematics and Statistics 2018 – Key Findings.*

[6] Information about the sampling process and the achieved samples can be found in Appendix 1, *NMSSA Report 21 Technical Information 2018.*

3. Structure of the social studies report

This report is designed to provide a succinct overview of the 2018 NMSSA social studies study. The report is set out in four chapters.

- This chapter, Chapter 1, has provided an overview of the 2018 NMSSA programme.
- Chapter 2 briefly describes the 2018 social studies programme, including information about how social studies achievement was assessed and the contextual questionnaires.
- Chapter 3 presents the findings related to achievement in social studies and reports these against the levels of the social studies learning area of the NZC. It also reports on changes in achievement observed between 2014 and 2018.
- Chapter 4 looks at contextual factors related to teaching and learning in social studies using questionnaire data collected from students, teachers and principals.

An appendix contains summary tables of statistics for social studies.

4. Further information

This report is supplemented by two other reports and an online interactive s tistic l appl cation.

The report *Social Studies 2018 Insights* provides in-depth information f teac ers and schools about the 2018 social studies assessment including annotated examples of quest ons nd tasks used in the assessment.

The report *Technical Information 2018* contains background and t hnical information, including information about the characteristics of the samples of stud nts f m whom data were collected, the conceptualisation and development of the social studies ssessment programme, construction of the measurement scale, procedures for linking data from 2014 and 2018 and the methodology of the study.

The online interactive application allows users to generate tables and graphs using achievement and contextual data generated by the 2018 study.

All reports and the interactive application c n be found o the NMSSA website (www.nmssa.otago.ac.nz). The *Social Studies 2018 Insight*s report will be vailable on the website after the other reports.

2 2018 NMSSA Social Studies Study

This chapter provides an overview of the 2018 NMSSA social studies study. It includes three parts.

- Part 1 briefly describes social studies within the social sciences learning area of the New Zealand Curriculum (NZC) and describes the components of the 2018 NMSSA social studies programme.
- Part 2 details how social studies achievement was assessed.
- Part 3 outlines the social studies contextual information collected from students, teachers and principals.

1. Social studies within the social sciences learning area and the New Zealand Curriculum

The NZC states that:

> The social sciences learning area is about how societies work and how people (including the students themselves) can participate and take action as critical, informed and responsible citizens. Contexts are drawn from the past, present and future and from places within and beyond New Zealand (p. 30).

Achievement objectives (AOs) for social studies are defined for levels 1–5 of the social sciences learning area. From level 6, the AOs of social sciences are accompanied by AOs for the specialist areas of history, geography and economics.

In learning social studies, students develop and apply skills to enable them to participate in society as critical, informed and responsible citizens through investigating society, exploring issues, making decisions and working co-operatively with others.

2018 social studies programme

An advisory panel of social studies curriculum experts met with the NMSSA project team in 2017 to consider the NMSSA social studies programme. The NMSSA team drew on this panel discussion and the 2014 NMSSA social studies assessments to develop an assessment framework[7] and programme for the 2018 study.

The components of the 2018 social studies programme are outlined in Table 2.1.

[7] See Appendix 7, *NMSSA Report 21 Technical Information 2018*.

Table 2.1 Components of the 2018 NMSSA social studies programme

Component	Focus	Approach and achieved sample
Assessment		
1. Nature of Social Studies (NSS)	• Conceptual understanding • Values and perspectives • Active participation in society • Using information	A three-part assessment incorporating: • computer and paper-and-pencil tasks that involve multi-media elements, completed by 1200 students at each year level • a series of in-depth one-to-one tasks requiring oral and written responses, undertaken with 600 students at each year level • a series of tasks involving group discussion/participation, undertaken by 00 students at each year level
Contextual information		
2. Student questionnaire	• Attitude to, and confidence about, learning social studies • Opportunities to learn social studies and take social action at school	• Computer-presented questionnaire, completed by 1200 students a each y r level
3. Teacher and principal questionnaires	• Teacher and principal views of social studies learning and teaching in their school • Teachers' attitudes to social studies and their confidence as a social studies educator • Learning opportunities for students in social studies • Provision for supporting social studies – learning and teaching programme, resourcing, and professional learning and development	• Paper-an penc o onlin questionnaires, completed y 240 each rs at Year 4 and 234 at Year 8; and 3 principals at Year 4 and 91 at Year 8

Appendix 7 of the *Technical Information* report de ails the NMSSA 2018 social studies assessment framework that sets out the underlying constructs, str nds nd contexts that were assessed by each task that made up the NSS assessment. The tasks also included op rtunit es for using the knowledge, attitudes and values that are expressed as key competencies in the NZC: thinking; using language, symbols and text (including literacy and numeracy); relating to others; man ging self; and participating and contributing in social studies.

Appendix 2 of the *Tec nical Information* report describes how the assessment tasks were developed, administered to student and marked.

2. Assessing achievement in social studies

Nature of S cia Studies assessment

The Nature f Social Studies (NSS) is an assessment construct derived from key attributes in social studies as ou ined in the NZC. It was developed by social studies and assessment experts to support assessment in s cial studies. The assessment was made up of three parts: computer and paper-and-pencil tasks that involved mul i media elements; in-depth one-to-one tasks requiring oral and written responses; and tasks involving group discussion/participation.

Conceptual understanding: Conceptual understandings are big ideas that students develop within social studies about society. The concepts relate to the four conceptual strands of social studies in the NZC: identity, culture and organisation; place and environment; continuity and change; and the economic world.

Active participation in society: Active participation in society is to be constructively involved in participating in, or observing, critically informed actions in relation to local or global issues.

Values and perspectives: Values are deeply held beliefs about what is important or desirable. They are expressed through the ways people think and act.

Using information: Using information requires gathering and analysing useful information to inform conclusions and support decision-making.

Students' conceptual understandings in social studies may be developed using a social inquiry approach. In a classroom context, a social inquiry approach requires students to:

- ask questions, gather information and background ideas, and examine relevant current issues [Using Information]
- explore and analyse people's values and perspectives [Values and Perspectives]
- consider the ways in which people make decisions and participate in social action [Active Particip on in Society]
- reflect on and evaluate the understandings they have developed and the responses that may be requ red. (NZC, p. 30).

While it was not possible to include a social inquiry activity within the NMSSA ass ssm t programme, aspects of the process were examined within carefully designed tasks. Co texts fo asse sment tasks were chosen to reflect New Zealand's bicultural heritage, with the aim of being rel vant nd interesting for Year 4 and Year 8 students across New Zealand. The tasks covered the strands of id ntity culture and organisation; place and environment; continuity and change; and the economic wor d.

Examples of NSS assessment tasks:

1. Kai Moana

Kai Moana was an interview task for Year 4 and Year 8 students. It assessed two constructs: conceptual understanding, and values and perspectives. At the start of the task, the student was told by the teacher assess r that they were going to hear some information about gathering seafood or kai moana. Students could take note but responded orally the questions posed by the teach asse sor. Three pieces of informat on were presented on separate cards which were read and shown to tuden for the appropriate questions. The in ormation cards are shown in Figu 2.1.

The *Kai Moana* task contained six items. These are shown in Figures 2.2 to 2.5 along with their respective construct/s, focus, scoring guide, and examples of responses. The teacher's script and actions are in italics.

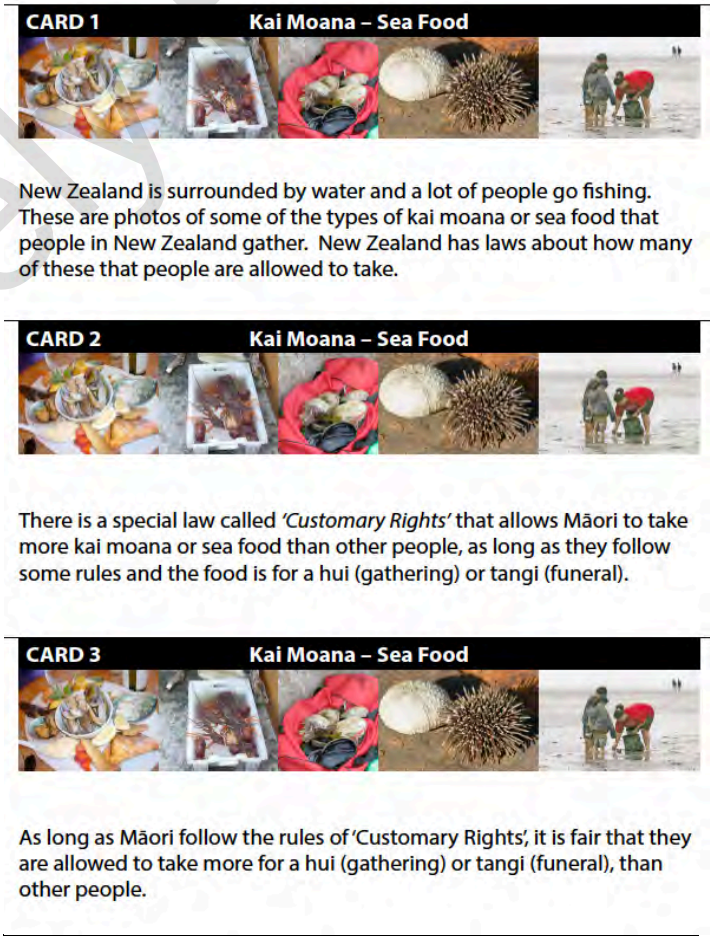


Figure 2.1 Information cards for the *Kai Moana* task

Teacher: *You are going to hear some information about gathering seafood or kai moana. As you are listening, think about why New Zealand needs to have laws to do with gathering kai moana.*

Read Card 1.

ITEM 1: *Why do we have laws about the amount of seafood and the size of seafood people can take?*

Construct: Conceptual understanding
Focus: Using resources and sustainability

Scoring guide	Examples
0: Demonstrates no understanding of the concepts	No response/don't know/unsure Response not relevant. e.g. meal size
1: Demonstrates a surface understanding of concrete concepts	Surface. e.g. extinction of species; people will take too many; won't be any more left; they'll die out
2: Demonstrates a deep understanding of abstract concepts	Deeper. e.g. sustainability, considering others and he implications; considering the future – leave small ones o grow; cultural value of giving back to the sea

Figure 2.2 Item 1 of *Kai Moana*

Teacher: *Here is some information about a special law called 'Customary Rights'*

Read Card 2.

Teacher: *Here is an opinion some people have about 'Customary Rights' fo Māo i*

Read Card 3.

ITEMS 2–3:
2A. Why might people agree with that?
*2B. What do you mean by _____? **OR** Can you tell me more about ___ ____ ((st ent response from 2A)*
3A. Why might people disagree with that?
*3B. What do you mean by _____? **OR** Can you tell me more a ou _____?((student response from 3A)*

Constructs: Conceptual understanding
Recognising diverse values and perspectives
Focus: Status of Māori as tangata whenua

Scoring guide	Ex mples
0: Demonstrates no understanding of the concep Unable to explain others' values positions	N esponse/don't know/unsure Only ives 1 point of view at a **surface** level. e.g. t ey need more for a tangi
1: Demonstrates a surface understanding of c ncre e concepts Explains others' values on a simple/s rface level	Surface. **Both** viewpoints are recognised. e.g. been given rights; they need more for a tangi; it's the law; unfair they get more
2: Demonstrates a deep und rstandi o abstract concepts Explains others' values n a mo e complex/deep level	Deeper connections with culture/beliefs (one side). e.g. Māori as tangata whenua; we all have equal rights, so it should be the same for all, sacredness of seafood to Māori; discrimination

Figure 2.3 Items 2 3 of *Kai Moana*

Teacher: *T ese are three 'big ideas' that have to do with gathering seafood or kai moana – sustainability, responsibility and rules*

Pla e the th ee 'big idea' words in front of student.

Teacher *Sustainability means to keep something going or happening.*

TEM 4: *Use these big ideas together, to tell me what they have to do with gathering seafood or kai moana.*

Construct: Conceptual understanding
Focus: Making connection between concepts

Scoring guide	Examples
0: Shows no awareness of how concepts are connected	No response/don't know/unsure/response not relevant. Shows no awareness of how the concepts are connected
1: Explanation of concepts within a specified context	Talks about 2 or 3 individual concepts in relation to kai moana
2: Complex/deeper connection between concepts	Explanation with connections between 2 or 3 concepts in relation to kai moana

Figure 2.4 Item 4 of *Kai Moana*

ITEMS 5–6: *Where else might these big ideas be important? (sustainability, responsibility and rules) How are these big ideas important in those places?*	
Construct: Conceptual understanding **Focus:** Transferring and connecting concepts to different contexts	
Scoring guide	**Examples**
0: Unable to transfer the concepts to a different context	No response/don't know/unsure Response not relevant.
1 Limited transfer of concepts to a different context	Explains 1–3 individual words in another context/s. E.g. follow rules on road or at school
2: Clear transfer and linking of concepts to a different context	Explains linked words **clearly** (2 or 3 words) to a context E.g. rules/responsibilities – follow road rules and t is shows you are a responsible driver

Figure 2.5 Items 5–6 of *Kai Moana*

2. Good Sorts

Good Sorts was a group-administered task for Year 4 and Year 8 students. It asses ed two onstructs: conceptual understanding, and active participation in society. The setting was New Ze land

The *Good Sorts* task contained four items, shown in Figures 2.6 to 2.9, along with t ir respective construct/s, focus, scoring guide and examples of responses. The teacher's script is in itali s Students responded orally to each question.

Teacher: In this activity you will watch a video about Mia, wh rai d m ey for he S.P.C.A. The S.P.C.A. is an organisation that helps look after animals Mia ra ed mon y by baking for other people. As you watch the video, think about what she d d to m his a successful fundraising project.

Play video.

ITEM 1: *Before Mia started to fundraise, what would she h ve had to do o that her fundraising project was successful? List three different ideas.*	
Construct: Conceptual understanding **Focus:** Identify a market and opportunity	
Scoring guide	**Exam es**
0: Shows no understanding of the concep s	Inappropriate response. e.g. sell the baking
1: Shows understanding of surface ide s	Surface ideas. e.g. make sure it tastes good
2: Shows understanding o deep bstrac ideas	Deeper ideas. e.g. costings; pricing; advertising; presenting self and product; 'say the casue'; test it to see if it tastes good; plan it; get teacher approval; tell people
3: Extends understanding of deep/abstract concepts	Conceptual – extending deeper ideas. e.g. market research – consider what consumer wants; find consumer (who would buy it); consider cause; make a plan considering needs and wants; consider sponsorship

Figure 2.6 Item 1 o *Good Sorts*

T e S.P.C.A gained from Mia's fundraising because they got money. Mia and her teachers gained from the fundraising too. Both Mia and her teachers also learnt things from the fundraising. **ITEM 2a:** *What might the **teachers** have gained? What might they have learnt?*	
Construct: Active participation in society **Focus:** Recognise the contribution of others to society	
Scoring guide	**Examples**
0: Unable to identify how the actions of others contribute to society	Inappropriate response. e.g. weight
1 Identifies concrete/surface contributions of the actions of others to society	Surface ideas. e.g. food
2: Identifies abstract/deep contributions of the actions of others to society	Deeper ideas – abstract. E.g. satisfaction of giving to a good cause; knowledge that students can manage projects; joy in sharing someone's interest; small things make a big difference; animals matter

Figure 2.7 Item 2a of *Good Sorts*

ITEM 2b: *What might **Mia** have gained? What might she have learnt?*	
Construct: Active participation in society **Focus:** Recognise the personal or social significance of actions	
Scoring guide	**Examples**
0: Unable to identify how the actions of others are of personal or social significance	Inappropriate response
1: Identifies concrete/surface personal or social significance of actions	Surface ideas – immediate benefit. e.g. money for the S.P.C.A; has fun; animals matter
2: Personal or social significance of actions is observable	Deeper ideas – observable behaviours; longer-term benefits. e.g. baking skills; financial skills; project management; small things make a big difference
3: Personal or social significance of actions is invisible	Deeper ideas – invisible influences on values/beliefs and longer-term benefits; altruistic e.g. satisfaction of helping others; confidence; pride in success; don't give up keep trying; you can do anything if you try

Figure 2.8 Item 2b of *Good Sorts*

Mia said, 'Small things make a big difference.' Mia did a small thing by baking and raising money The money raised made a big difference for the S.P.C.A. ITEM 3: a) Give another example where someone could do something small that would make a big difference. b) How would that make a difference?	
Constructs: Conceptual understanding Active participation in society **Focus:** Transfer concepts to a different context Recognise the contribution of themselves or others o s iety Identify how they or others can participate/take actio	
Scoring guide	**Examples**
0: Unable to explain the impact of social action Unable to transfer to a different context	I appropriate response. E.g. If you do something small it ca change the world; make art and sell it; pick up rubbish *By st pping cruelty to the animals because some animals are in danger (not a small thing)* *Response links to SPCA and/or example in the task e.g. sell firewood and give the money to SPCA – it would help pets get food; raising money, baking – helps other animals*
1. Demonstrates simple dersta ding of social action (surface) *Limited explana on of impac f social action* Limited transfe of conce ts to a different context	Transfer of concept with limited explanation of the social impact. e.g. raise money for charity; pick up rubbish at school *Helping out the community by making things better for them; raise money for the homeless so they can have a better life; help a bully – one more nice person in the world*
2: Demonstr tes u derstanding and impact of social actio (de) Clear tra sfer of concepts to a different context	Clear transfer and explanation of *impact of social action*. e.g. visit neighbour – it would help the community be a friendly/secure place to live; by donating to charity (e.g. hospital) it can help doctors/nurses buy things to help other people *Help people with a disability – will help them with things they can't do; pick up rubbish around Lake Taupo – wouldn't be so much pollution*

Figure 2.9 Item 3 of *Good Sorts*

Reporting achievement on the NSS assessment

Item Response Theory (IRT)[8] was used to construct a measurement scale for the NSS assessment. The techniques used to do the scaling were similar to those used in international assessment studies, such as PISA and TIMSS[9].

For ease of understanding, the NSS scale was standardised so that:

- the average of all students (Year 4 and Year 8 combined) was equal to 100 scale score points
- the average standard deviation for the two year levels was equal to 20 scale score points.

In order to compare results from 2014 with those from 2018, the 2014 achievement scale was linked to the 2018 NSS scale by comparing the scale locations of the common questions used in both assessments.

NSS scale description

Figure 2.10 provides a description of the skills and knowledge measured by the NSS scale. Th de crip ion was developed directly from the data collected using the NSS assessment. Each band identifi the skill and knowledge that students scoring at these points on the scale can typically display. T e list of skills and knowledge is not hierarchical but is arranged by construct (conceptual understanding act ve participation, values and perspectives, and using information). The lowest band identifies eme gent kills and knowledge that students scoring at this point of the scale sometimes display.

On the right hand side of the scale description are listed the range of c pts, lements of social inquiry, and contexts that were covered in the NSS assessment.

Reporting achievement against curriculum levels

A curriculum alignment exercise was carried out in 2 14 to determine the minimum performance expectations (cut scores) on the 2014 NMSSA assessment for s dents achieving at curriculum levels 2 to 4. The linking of results from 2014 to 2018 allowed these cut scores to be located on the 2018 NSS scale, and the 2018 results to be interpreted in terms of achievement against curriculum expectations.

3. Contextual information

Students

All students in the social studies progr mme responded to a questionnaire, which asked them to rate a series of statements about the r attitudes to, and confidence to, learn social studies. Two measurement scales were constructed from the ratings: an Attitude to Social Studies scale and a Confidence in Social Studies scale. The questionnaire also asked tudents to indicate how often they experienced a range of learning opportunities in soc al stud s at school.

Teachers and p incipals

Separat ques onnaires were developed for teachers and principals to gain their views on the learning and teac ing of social studies.

The te cher questionnaire asked teachers about their attitude to social studies, their confidence as a social studies t cher, students' learning experiences in social studies at school, resourcing, and professional development and support. One measurement scale was constructed: the Teacher Confidence in Teaching Social Studies scale.

The principals of the schools involved in the study were also asked to complete a questionnaire, or delegate it to another member of the school leadership team.

[8] IRT is an approach to constructing and scoring assessments and surveys that measure mental competencies and attitudes. IRT seeks to establish a mathematical model to describe the relationship between people (in terms of their levels of ability or the strengths of their attitude) and the probability of observing a correct answer or a particular level of response to individual questions. IRT approaches provide flexible techniques for linking assessments made up of different questions to a common reporting scale. The common scale allows the performance of students to be compared regardless of which form of the assessment they were administered.

[9] Examples of international assessment studies: Program for International Student Assessment (PISA) and Trends in International Mathematics and Science Study (TIMSS)

The principal questionnaire asked a range of questions about learning and teaching in social studies across the school including questions related to strategic planning, assessment planning and policy, inclusion of diverse learners, resourcing, and professional support.

Figure 2.10 Description of the Nature of Social Studies (NSS) scale

3 Student Achievement in Social Studies

This chapter describes Year 4 and Year 8 student achievement in social studies based on results from the 2018 Nature of Social Studies (NSS) assessment.

Within this chapter, any reported differences between groups are statistically significant unless stated otherwise.

Full tables of results related to reporting in this chapter are available in the Appendix.

1. Achievement on the Nature of Social Studies assessment

Achievement against the curriculum

Twice as many students at Year 4 achieved at or above the exp c ed curriculum level than Year 8 students

At Year 4, 73 percent of students scored above the minimum score on the NSS scale associated with achieving curriculum level 2 objectives. At Year 8, 37 per ent of Year 8 students scored above the minimum score associated with achieving curriculum level objectives. There were variations in the percentage of students in population subgroups (gende ethnicity, special education needs, decile band and school type) who achieved at the expected curriculum levels at each year level (See Tables A1.6 and A1.7 in the Appendix).

Achievement by year level

On average, Year 8 students sco ed hig er on he NSS assessment than Year 4 students

The box plot in Figure 3.1 shows th distribution of scores on the NSS assessment for Year 4 and Y ar 8. On average, Year 8 s ude ts scored 39 scale score points higher than Year 4 student . This indi ates that, on average, students make about 10 scale score oints f progress' per year b tween Year 4 and Year 8. Th annualis d difference of 10 scale score points can be used to r present the average achievement gain on the assessment associated with about one year of instruction.

The average achievement gain was similar for all population subgroups, including students with special education needs.

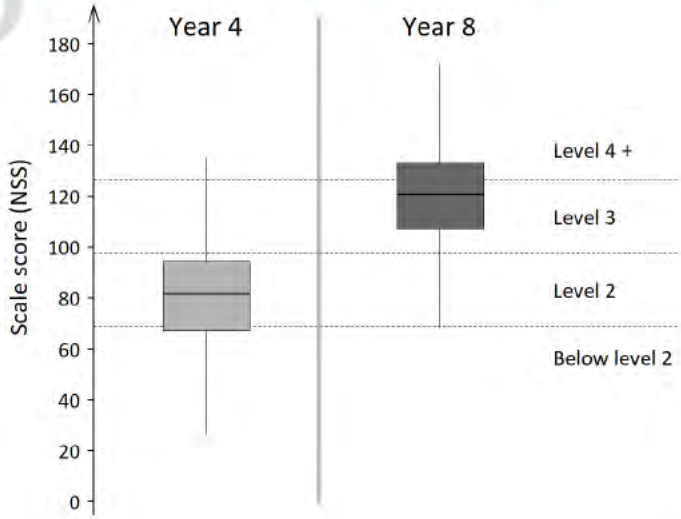


Figure 3.1 Distribution of students' scores on the Nature of Social Studies (NSS) scale, by year level

Achievement by student-level variables

Figures 3.2 and 3.3 display the score distributions on the NSS assessment at Year 4 and Year 8, respectively, for all students and by gender and ethnicity[10].

Girls achieved better, on average, than boys

Girls scored higher, on average, than boys on the NSS assessment by 4 scale score points at Year 4 and 8 scale score points at Year 8. This was also the case for Māori girls and Māori boys at Year 8 (11 scale score points difference) and Pacific girls and Pacific boys at Year 4 (7 scale score points difference).

On average, non-Māori and non-Pacific students achieved better than Māori and Pa ific students, respectively

Māori students scored lower, on average, than non-Māori (by 10 scale score points at Ye 4, and 11 scale score points at Year 8).

Pacific students scored lower, on average, than non-Pacific (by 13 scale score point at Year 4 and 11 scale score points at Year 8).

Figure 3.2 Distributio of s res fo Year 4 students on the Nature of Social Studies (NSS) assessment, by gender and ethnic (ZE=New Zealand European)

Figure 3.3 Distribution of scores for Year 8 students on the Nature of Social Studies (NSS) assessment, by gender and ethnicity (NZE=New Zealand European)

[10] Non-prioritised ethnicity was used where students could identify with up to three ethnicities. This meant they could be present in multiple ethnic groups. Student ethnicity data were obtained from National Student Number information held on the Ministry of Education ENROL database. The 'New Zealand European' category included New Zealand Pākehā, Australian and British/Irish. The 'Pacific' category included Tokelauan, Fijian, Niuean, Tongan, Cook Islands Māori, Samoan and other Pacific peoples. The 'Asian' category included Filipino, Cambodian, Vietnamese, other Southeast Asian, Indian, Chinese, Sri Lankan, Japanese, Korean and other Asians. The 'Other' category included German, Dutch, Greek, Polish, South Slav, Italian and other Europeans, Middle Eastern, Latin American, African, and Not Stated.

On average, students with special education needs performed less well than students who did not have special education needs

At both year levels, the average NSS assessment score for students with special education needs was lower than that for students who did not have special education needs by about 17 scale score points.

Achievement by school-level variables

Figures 3.4 and 3.5 (following page) show the performance of students according to school decile band[11] and school type[12].

Students attending high and mid decile schools typically scored higher than tho e attending low decile schools

At both year levels, students from high decile schools scored higher, on average, than st dents from low decile schools (by 18 scale score points). Students from high decile schools scored higher, on average, than those from mid decile schools by 9 scale score points at Year 4 and 8 scale score oint at Year 8.

On average, Year 8 students attending secondary schools core higher than those attending full primary and intermediate schools

At Year 8, the average score for students attending secondary school was 4 scale score points higher than for those attending full primary schools and 5 scale sc re p nts higher than for those attending intermediate schools. It is important to note that ne rly all of the secondary schools in the study were mid and high decile schools, while full primary and in rmediate schools were more evenly distributed across the decile bands.

Differences between the average scores for stude ts in full primary and contributing schools at Year 4, or between full primary and intermedia e sch ols a Year 8 were not statistically significant.

[11] The *low* decile band comprised students in decile 1 to decile 3 schools, the *mid* band comprised students in decile 4 to decile 7 schools, and the *high* band comprised students in decile 8 to decile 10 schools.

[12] A *composite* school combines students from different year levels that are typically found in separate primary or secondary schools. A *contributing* school caters for Years 1 to 6 of schooling. A *full primary* school caters for Years 1 to 8 of schooling. *Secondary* schools cater for Year 7 to Year 15 of schooling, although many cater for Year 9 to Year 15 only. An *intermediate* school caters for Years 7 and 8 of schooling.

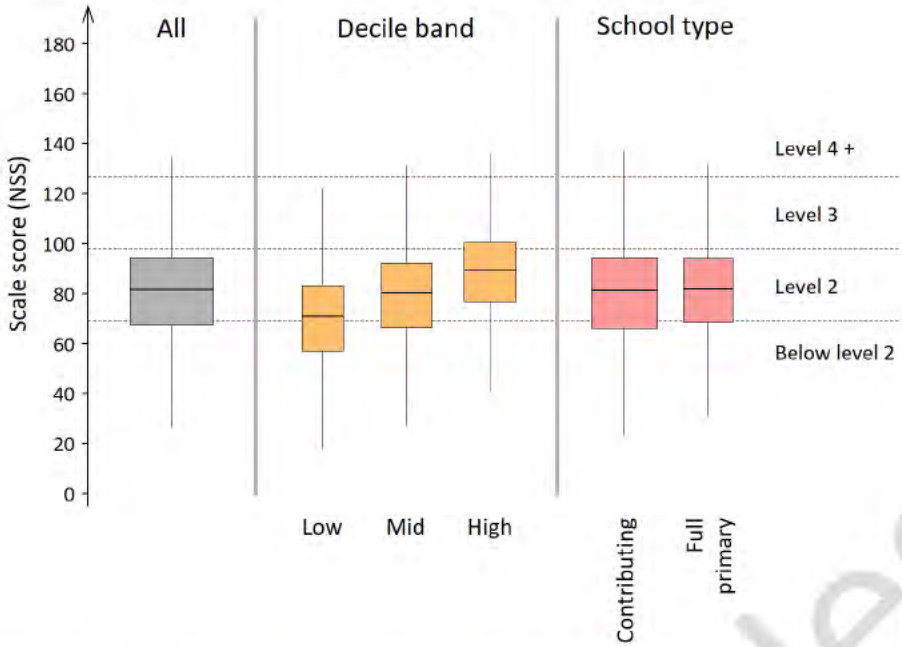
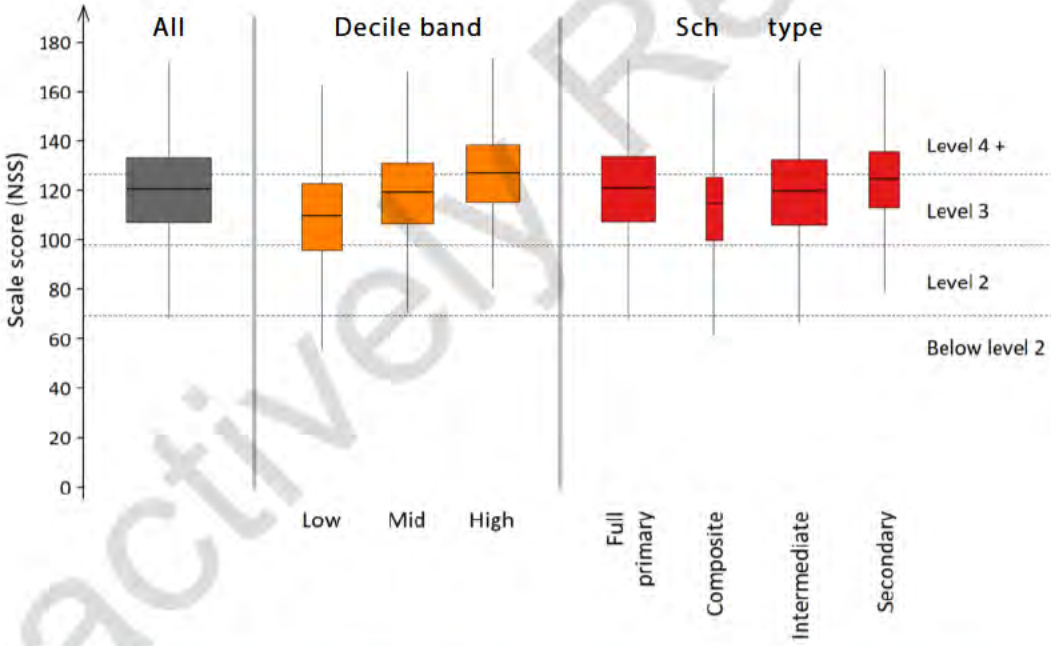


Figure 3.4 Distribution of scores for Year 4 students on the Nature of Social Studies NSS) assessment, by decile band and school type



Figur 3.5 Distribution of scores for Year 8 students on the Nature of Social Studies (NSS) assessment, by decile band and school type

2. Changes in achievement since 2014

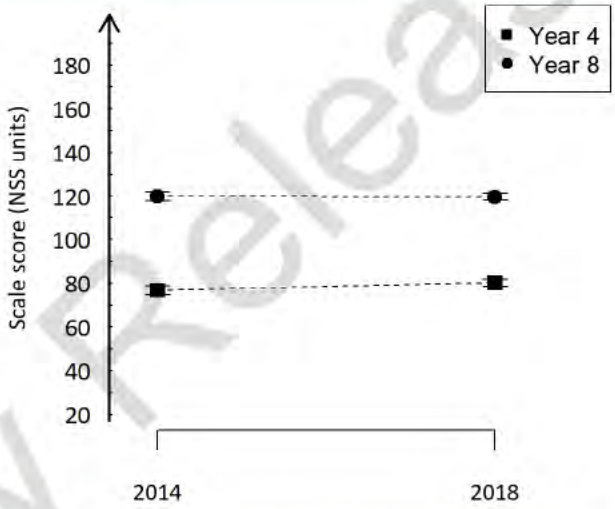
Social Studies was last assessed by NMSSA in 2014. In order to compare students' achievement on the Nature of Social Studies (NSS) assessment in 2014 with that in 2018 a linking exercise was undertaken based on the common items used at both points in time[13]. The linking exercise was used to transform the 2014 scores to equivalent scores on the new scale developed for 2018.

Note: It is important to be cautious in interpreting the figures comparing achievement in 2018 with achievement in 2014. Several factors changed in the assessment of NSS between 2014 and 2018. The changes related to differences in the methods of assessment used (in 2018 a group-administered task was introduced) and the limited number of common items.

On average, in 2018, Year 4 students achieved higher than in 2014 while, on a erage Year 8 students achieved the same

Figure 3.6 shows the average NSS scores from 2014 and 2018. In 2018, Year 4 students' average score was 4 scale score points higher than the average score for Year 4 students on the 2014 assessment. The increase was statistically significant. For Year 8 students, there was no change in the average score.

Several subgroups showed statistically significant increases in their average scores from 2014 to 2018 (Table 3.1). These included Year 4 girls, Year 4 Māori students, Year 4 Pacific students, Year 4 Asian students, and Year 4 and Year 8 students from low cile schools. Note that the confidence intervals associated with the change in averag sc res is relatively wide for some of these groups



Figur 3.6 Average scores on the Nature of Social Studies (NSS) assessment in 2014 and 2018, by year level

Table 3.1 Change in average N ture o Social Studies (NSS) assessment scores between 2014 and 2018 by year level, gender, e hnicity and deci and

Year 4			Year 8		
	Diffe ce in verage NSS scores	95% confidence interval[14]		Difference in average NSS scores*	95% confidence interval
All students	**3.6**	1.1, 3.3	**All students**	0.0	-2.5, 2.5
Girls	**4.8**	1.1, 8.4	**Girls**	2.2	-1.12, 5.6
Boys	2.2	-1.1, 5.6	**Boys**	-2.0	-5.3, 1.4
NZE**	0.6	-2.1, 3.3	**NZE**	-2.2	-5.0, 0.5
Māori	**5.9**	0.3, 11.5	**Māori**	1.7	-3.4, 6.8
Pacific	**12.3**	4.8, 19.8	**Pacific**	2.0	-4.0, 8.8
Asian	**9.8**	3.1, 16.5	**Asian**	4.5	-2.4, 11.4
Low	**9.5**	4.5, 14.5	**Low**	**5.6**	0.0, 11.1
Mid	0.0	-3.7, 3.7	**Mid**	0.3	-3.2, 3.8
High	1.1	-2.3, 4.5	**High**	-2.2	-5.6, 1.1

*Differences in average NSS scores in bold font are statistically significant. **NZE = NZ European

[13] See Appendix 7, *NMSSA Report 21 Technical Information 2018,* for details of the exercise used to link results from 2014 with 2018.

[14] The 95 percent confidence interval is a range of values that you can be 95 percent certain contains the true average of the population. See Notes in the Appendix.

The percentage of students in Year 4 achieving at or above curriculum expectations on the NSS assessment showed a corresponding increase of 10 percentage points, while that of Year 8 was 1 percentage point (Table 3.2).

Table 3.2 Percentage of students achieving at or above curriculum expectations for 2014 and 2018 on the Nature of Social Studies (NSS) assessment, by year level

		Percentage of students at or above expected curriculum levels	
	Expected curriculum level	**2014**	**2018**
Year 4	Level 2	63	73
Year 8	Level 4	36	37

4 Contextual Findings: Learning and Teaching in Social Studies

This chapter explores data collected about learning and teaching in so ial studies sing the student, teacher and principal questionnaires. The chapter is divided into thr ection with each focused on one of the questionnaires. Where the same or similar questions were sked in 2014, a hort description looking back at the responses made in that year is provided.

Note: For some questions in the Year 4 student questionnaire, t ere were relatively high numbers of missing responses (up to 15 percent of Year 4 students)[15]. Ther fore, the percentage of missing responses are included when we report how students responded to a question. For analyses involving scales, missing responses were not included. For analyses involving frequenci s, we r p rt 'notable'[16] differences in response patterns when the differences are present regardless of whether or not the missing responses have been used to calculate response frequencies.

1. Students' views on lea ning in social studies

All students in the 2018 NMSSA social studies programme were asked to complete a student questionnaire. The questionnaire asked st dents about themselves, their attitudes to, and confidence in, learning social studies, opportuniti s to learn s cial studies at school and how difficult they found social studies at school.

Table 4.1 show the tal number of students who responded to the social studies sections of the questionnaire and the percentage of students by school decile band and year level.

Table 4 1 Perce tage of students who responded to the social studies questionnaire, by school decile band and year level

	Percentage of Students	
Decil and	**Year 4 *N*=1150**	**Year 8 *N*=1162**
L w	24	23
Mid	37	37
High	39	40

[15] The pattern of non-response observed at Year 4 in 2018 has not been observed previously in NMSSA studies. It may have involved a level of confusion with how to use the computer to answer the questionnaire. It has led to changes in the way we present and administer the student questionnaire in 2019. In general, students who were more likely to leave questions unanswered were from low decile schools, Pacific students and students with special education needs compared with students from mid and high decile schools, non-pacific students and students with no special education needs, respectively.

[16] A 'notable' difference is defined as a difference in response frequency of 10 percentage points or greater.

Attitude to social studies

Overall, students were positive about learning social studies at school

Most students in Year 4 and Year 8 indicated at least some level of agreement with each of six statements related to their attitude towards learning social studies at school (Figure 4.1). For example, at Year 4, 63 percent of students used 'agree quite a lot' or 'totally agree' to respond to the statement: 'I like learning social studies at school'. At Year 8, the corresponding percentage was 56 percent.

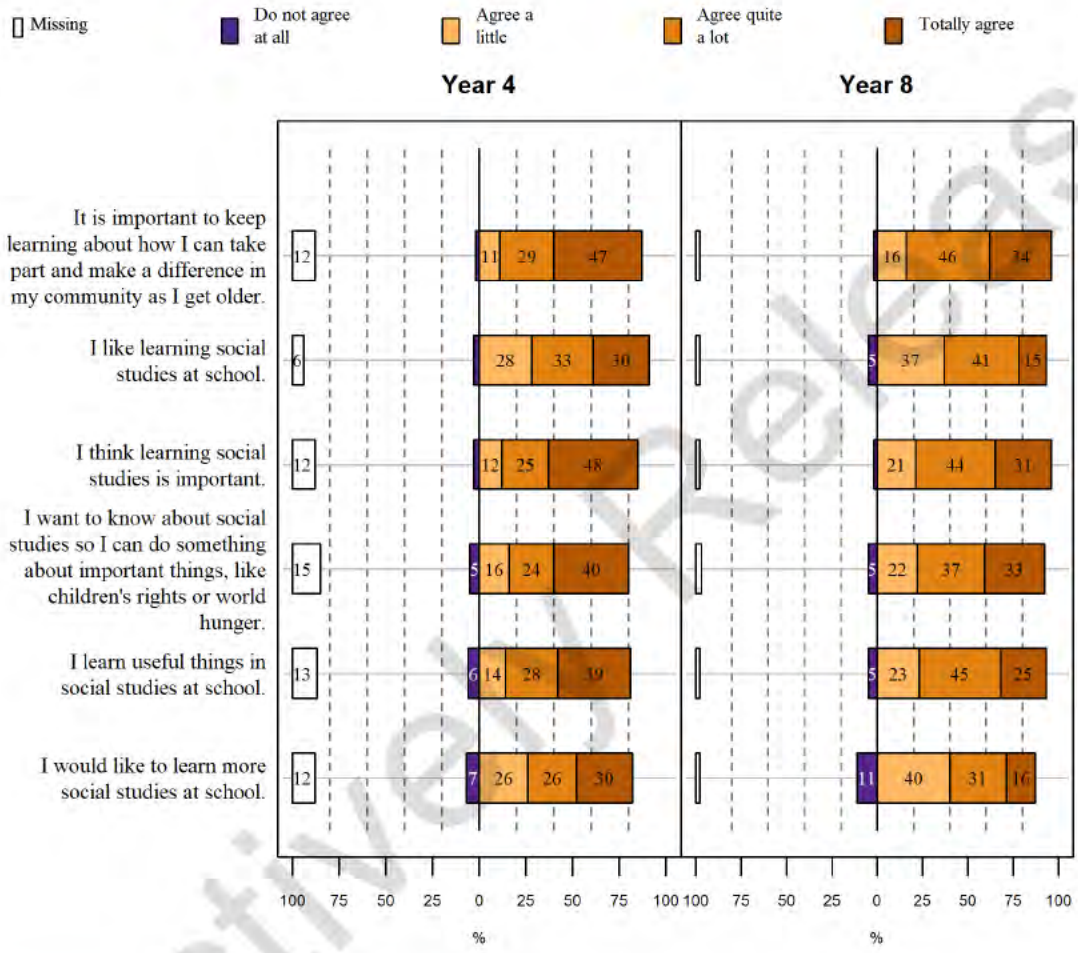


Figure 4.1 P entag of s udent responses to statements about their attitude to social studies, by year level

Attitude to Social Studies Scale

Responses to the attitude statements were used to locate students on an Attitude to Social Studies scale.

To aid interpretation, the scale was broken down into three score ranges. The 'very positive' part of the scale was associated with students mainly using the 'totally agree' category, the 'positive' section of the scale was associated with students mainly using either 'agree a lot' or 'agree a little', and the 'not positive' part of the scale was associated with students mainly using 'do not agree at all'.

On average, Year 8 students scored lower on the Attitude to Social Studies scale than Year 4 students

Year 8 students, on average, scored lower on the Attitude to Social Studies scale than Year 4 students by 7 scale score units (Figure 4.2). This finding is typical of most learning areas assessed by NMSSA.

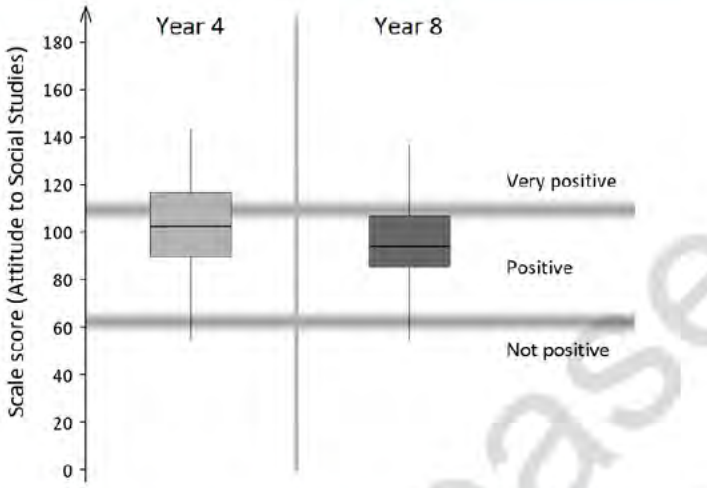


Figure 4.2 Distribution of stude ts' sco s o the ttitude to Social Studies scale, by year le el

There were differences in Attitude to Social Studies scor s relat d to gender, ethnicity, school decile and school type

Statistically significant differences were found betw en the av e scores on the Attitude to Social Studies scale for a number of subgroups.

Girls scored higher than boys at both year levels y 2 and 5 scale score units, respectively.

Pacific and Asian students scored highe than non-Pacific and non-Asian students at both year levels by about 6 scale score units.

Year 4 students in mid decile schools sco ed higher than students in high decile schools by 2 scale score units. Year 8 students in low deci choo s scored higher than students in both mid and high decile schools by 5 scale score units.

Year 4 students with sp cial edu tion needs scored lower than those with no special education needs by 9 scale score uni

Year 4 student in contr b ting schools scored higher than those attending full primary schools by 3 scale score units.[17]

Looking back

Students' ttitudes to social studies in 2014 were similar to those expressed by students in 2018. In both years, Year 4 students were typically more positive than Year 8 students. For example, in 2018, 63 percent of students at Year 4 'agreed quite a lot' or 'totally agreed' with the statement: 'I like learning social studies at school'[18] compared with 64 percent in 2014. The corresponding figures for Year 8 students were 56 percent and 55 percent, respectively, for 2018 and 2014.

[17] At Year 8, sample sizes were too small for meaningful comparisons.

[18] In 2014, the item was 'I like doing social studies at school'.

Confidence in social studies

Overall, students were relatively confident about their learning in social studies

The majority of students at both Year 4 and Year 8 indicated some level of agreement with each of three statements related to their sense of confidence as a social studies learner (Figure 4.3). For example, at Year 4, 53 percent of students used 'agree a lot' or 'totally agree' to respond to the statement: 'I am good at social studies'. At Year 8, the corresponding percentage was 48 percent.

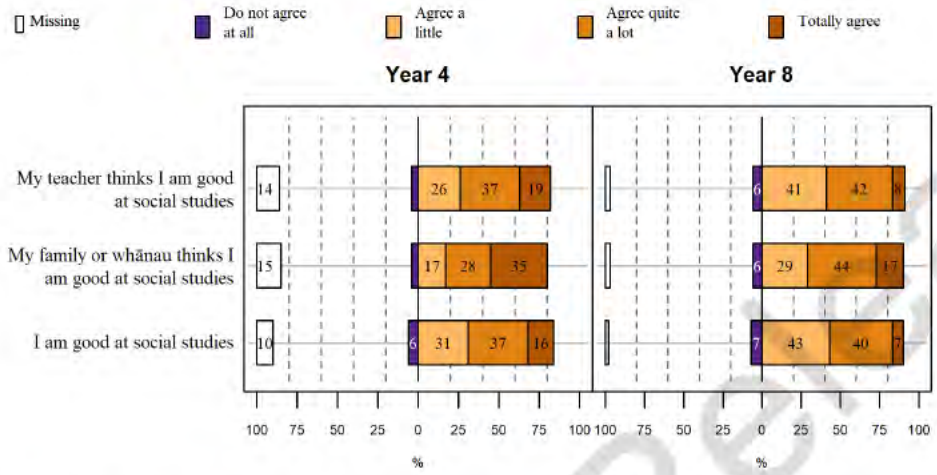


Figure 4.3 Percentage of student responses to statements bout heir fidence in social studies, by year level

Confidence in Social Studies Scale

Responses to the three statements related to confidence w re used to construct a Confidence in Social Studies scale. In a similar way to the Attitude to So ial Studies s ale, the Confidence in Social Studies scale was divided into three score ranges: 'very c nfident' 'confident'; and 'not confident'.

Overall, students i Ye r 8 w re less confident about their learning in social studies than students in Year 4

Overall, most students t both year levels scored in the 'c fident' part of the C nfidenc in Social Studies sca e. Y 8 students scored lower, n average, on the C fiden e in Social Studies scale than Y ar 4 students by 7 scale s ore units (Figure 4.4).

There were no differences in average Confidence in Social Studies score across gender, ethnicity, school decile or school type.

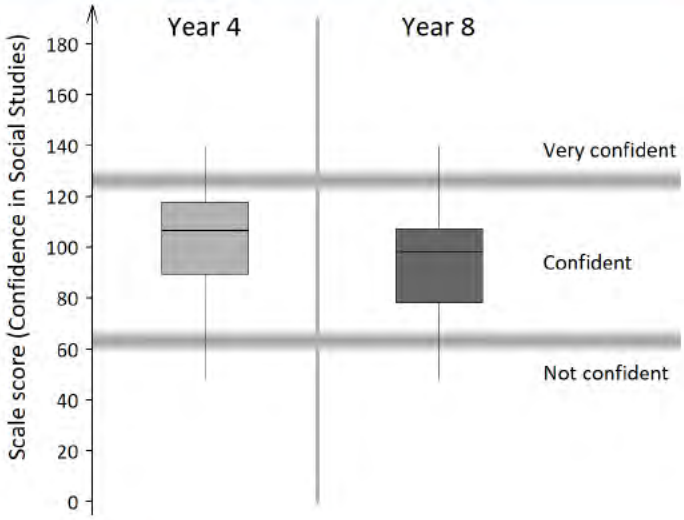


Figure 4.4 Distribution of students' scores on the Confidence in Social Studies scale, by year level

The relationship between attitude, confidence and achievement in social studies

Student achievement in social studies was weakly associated with attitude to, and confidence in, social studies

The relationship of achievement to attitude and confidence was examined by calculating correlation coefficients.[19] Scores on both the Attitude to Social Studies scale and the Confidence in Social Studies scale were weakly correlated with achievement on the Nature of Social Studies (NSS) assessment at both year levels (Table 4.2). At both year levels, the magnitude of the correlation coefficient was greater between confidence and achievement than attitude and achievement.

Table 4.2 Correlations of Attitude to Social Studies scores and Confidence in Social Studies scores with achievem t in social studies, by year level

	Attitude to Social Studies*	Confidence in Social Studies
Achievement in social studies at Year 4	0.11	0.15
Achievement in social studies at Year 8	0.09	0 19

* All correlations were statistically significant at $p<0.01$

Students' use of the social inquiry approach

The majority of students indicated they had used each element of the social inquiry approach

Students were asked how often they had used diffe ent lemen of the social inquiry approach to learning social studies. The majority of students reported h ving had a chance to use each element 'often' or 'very often' (Figure 4.5). The greatest percentage of stu ents experienced 'think[ing] about what I have learnt'. Seventy-five percent of Year 4 st dents and 80 percent of Year 8 students reported experiencing this 'often' or 'very often

For the following two elements: 'ask questions and get information about topics or themes' and 'learn about how people make decisions and ct on them', Year 8 students reported higher frequencies than Year 4 students. Responses across ender and ethnicity were similar. Responses across school decile were similar for the social inquiry elements except for asking questions and getting information about topics or themes where Year 4 tudents from low decile schools indicated they did this less often than students from high cile s hools.

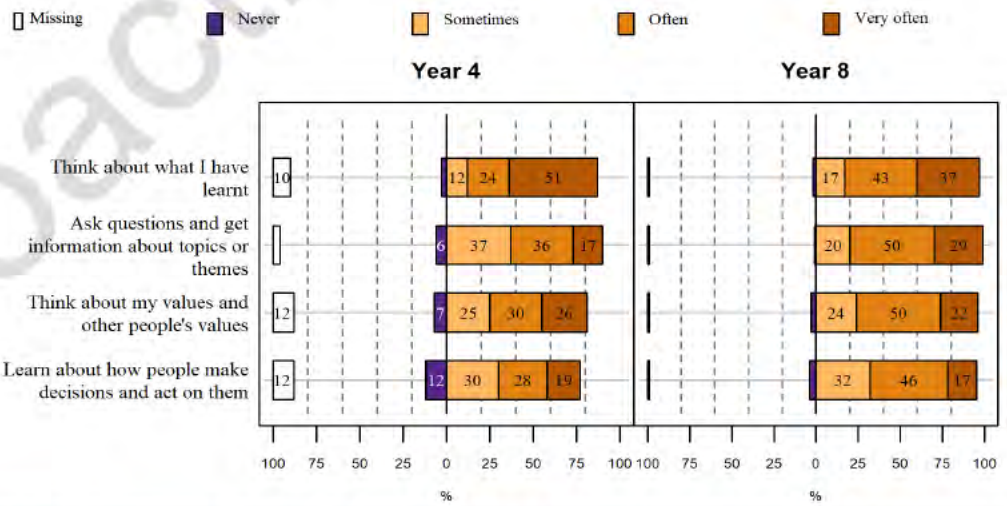


Figure 4.5 Percentage of students' responses regarding their opportunities to use elements of the social inquiry approach to learn social studies, by year level

[19] The *correlation coefficient*, *r*, can take a range of values from +1 to -1. A correlation of 0 indicates that there is no association or relationship between two measures (e.g. achievement and attitudes). A value greater than 0 indicates a positive association or relationship; that is, as the score on one measure increases, so does the score on the other measure.

Opportunities to learn social studies

The majority of students indicated that they were involved in a range of learning experiences in social studies

Presented with a range of statements describing learning opportunities in social studies, the majority of students in Year 4 and Year 8 indicated that they were involved in each opportunity 'often' or 'very often' (Figure 4.6). The exception to this was: 'Use digital devices or the Internet to connect with people outside school' where 49 percent of Year 4 students and 37 percent of Year 8 students reported 'never' having this opportunity.

At Year 4, the two opportunities reported most frequently were to 'make decisions in my school bout things that matter to us' and 'talk about the big ideas that we are learning about'. At Year 8 the wo opportunities reported most frequently were to 'use digital devices or the Internet to learn new things and 'talk about the big ideas we are learning about'.

In general, Year 8 students reported higher levels of involvement than Year 4 studen s. Ther were three exceptions where responses were similar: 'learn about things that have to do with our amilies, whanāu and communities', 'make decisions in my school about things that matter to us' and 'use digital devices or the Internet to connect with people outside school'.

In general, responses were similar across gender, ethnicity and s ho l decile. But, there were a few exceptions. For ethnicity, Pacific Year 8 students reported higher frequen ies than non-Pacific students for the item: 'learn about things that have to do with our amil es, w ānau and communities'. For school decile, Year 8 students from low decile schools rep ted higher frequencies than Year 8 students from high decile schools for the items: 'learn about things h t have to do with our families, whānau and communities' and 'use digital devices or the Internet to c nnect with people outside school'. Finally, Year 4 students from high decile schools report d higher frequencies than Year 4 students from low decile schools for the item: 'talk about my ideas w th other people in social studies'.

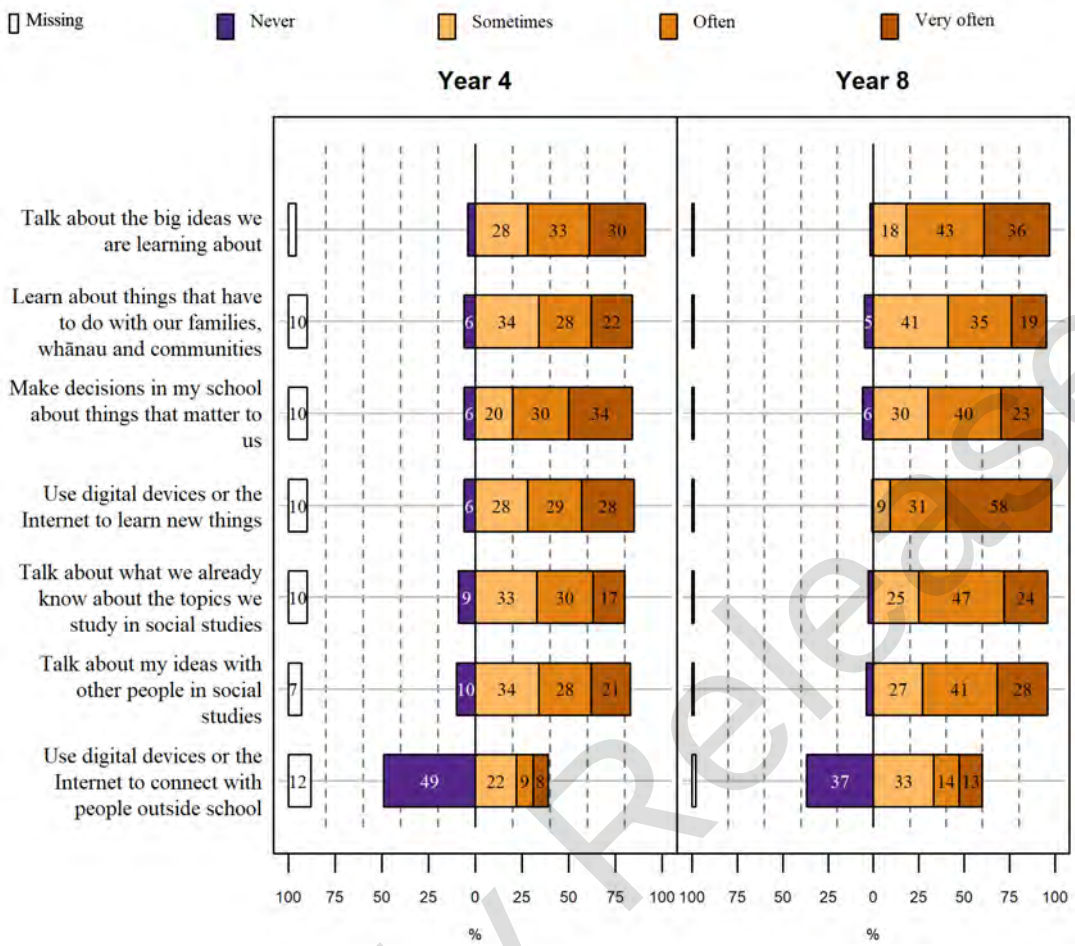


Figure 4.6 Percentage of students' respon es reg ding their involvement in a range of learning opportunities in social studies, by year level

Looking back

In 2014, three statements were cl se matches to those used in 2018: 'talk about what they already knew about the topics they study in so ia studies'; 'make decisions in school about things that matter to them' and 'discuss their id as wit other people'.

Students in 2018 and 2014 experienced similar opportunities to talk about what they already knew about the topics they study in social studies.

Howev r, a g eater percentage of students in 2018 compared to 2014 responded 'often' or 'very often' to opportunitie o 'make decisions in school about things that matter to them'. In 2018, 64 percent of Year 4 students and 63 percent of Year 8 students responded 'often' or 'very often' whereas in 2014, the corr sponding percentages were 54 percent for Year 4 students and 51 percent for Year 8 students. F r the opportunity to 'discuss their ideas with other people', at Year 4, the responses in 2018 were similar to 2014. But at Year 8, greater percentages in 2018 responded 'often' or 'very often' compared o 2014 (69 percent and 57 percent, respectively).

Opportunities for students to get feedback

Up to half of students reported getting feedback related to social studies 'often' or 'very often'

About a third to a half of students in Year 4 and Year 8 reported that the teacher told them how well they were doing in social studies 'often' or 'very often' (Figure 4.7). Year 4 students reported higher frequences than Year 8 students. Responses were similar across gender. However, Year 8 Pacific students and non-New Zealand European students reported higher frequencies than Year 8 non-Pacific and New Zealand European students, respectively. Year 8 students from low decile schools reported higher frequences than Year 8 students from high decile schools.

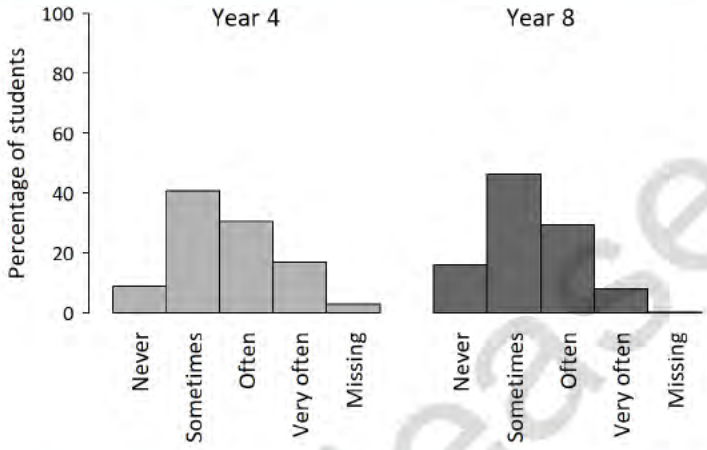


Figure 4.7 Percentage of students' r pon s reg rding how often teachers tell them how well ey are doing in social studies, by year le el

Looking back

In 2014, students were asked the same question r lated to feedback and their responses were similar to 2018.

Students' perceptions of the difficulty of their social studies learning

Most students rated the learning they did in social studies as 'about right for me'

When asked to rate th le rning they did in social studies in terms of difficulty, 81 percent of students at Yea 4 and 87 percent at Year 8 resp nded u ing the 'about right for me' ate ory (Figure 4.8).

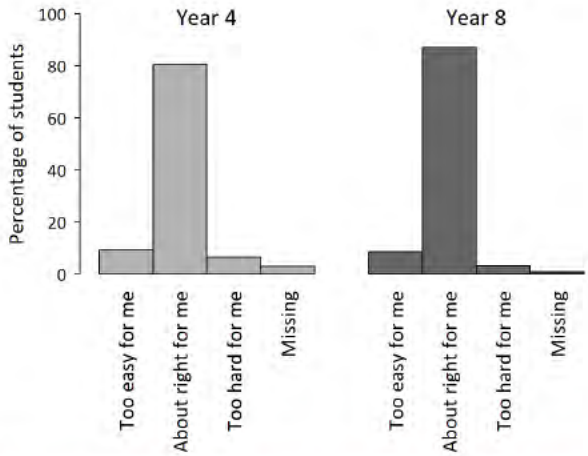


Figure 4.8 Percentage of students' responses regarding the difficulty of their social studies programmes, by year level

2. Teachers' views on learning and teaching in social studies

The teachers who participated

Up to three teachers from each school were asked to fill in the teacher questionnaire. The teachers invited to participate were those who had the most students involved in the NMSSA study. Table 4.3 shows the percentage of the teachers in Year 4 and Year 8 who responded by school decile band.

Table 4.3 Percentage of teachers who responded to the questions related to social studies in the questionnaire, by school decile band and year level

	Percentage of Teachers	
Decile band	**Year 4 (*N*=239)**	**Year 8 (*N*=224)**
Low	23	22
Mid	37	36
High	39	2

At Year 4, all teachers who responded were classroom teachers, 84 percent were emales and 55 percent had taught for more than 11 years. At Year 8, 96 percent of the teachers were lassr om teachers, 72 percent were females and 62 percent had taught for 11 years or more.

Nine percent of the teachers at Year 4 and 14 percent of teachers at Year 8 indicated that they had syndicate or school leadership responsibilities for social studies.

Note: the teachers who completed the questionnaires a each yea 1 vel do not necessarily constitute nationally representative samples. The findings related to teac ers should be interpreted as a broad indication of New Zealand teachers' views about learning in social studies.

Year 8 teachers were more likely to have qu lifications related to social studies than Year 4 teachers

The percentage of teachers who ind cated that they had a specialist focus in their initial teacher education or an undergraduate or postgr dua qual fication related to social studies (e.g. history, geography, economics etc) was greater at Ye r 8 than at Year 4 (Table 4.4).

Table 4.4 Percentag of tea hers with qualifications and work experiences related to social studies, by year level

	Year 4 (%)*	Year 8(%)*
Specialist soc al studie education focus in initial teache ducat n	5	16
Und rgra ua /post graduate qualification	15	19
Work e perience	0	1
Othe	3	10

Teache were able to tick all categories that applied

Approaches to teaching social studies

At Year 8, the conceptual strands in social studies were more often covered in a two-year cycle than over a longer term

The majority of teachers at Year 8 indicated that the conceptual strands in social studies were covered in a two-year cycle whereas similar percentages of Year 4 teachers indicated that the conceptual strands were covered in a two-year or longer-term cycle (Figure 4.9).

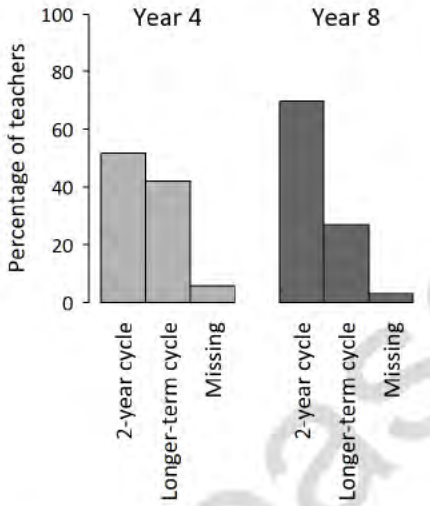


Figure 4.9 Pe enta e f teac ers reporting the cy le fo teac ing the concept al strands in social stud es, by ear level

Elements of a social inquiry approach were us d more frequently at Year 8 than at Year 4

The most frequently used element of social inquiry a b th year levels was to 'ask questions, gather information and background ideas, and examine curren issues' (Figure 4.10). Generally, a greater percentage of Year 8 teachers than Year 4 teachers reported using each element of a social inquiry approach 'often' or 'very often'.

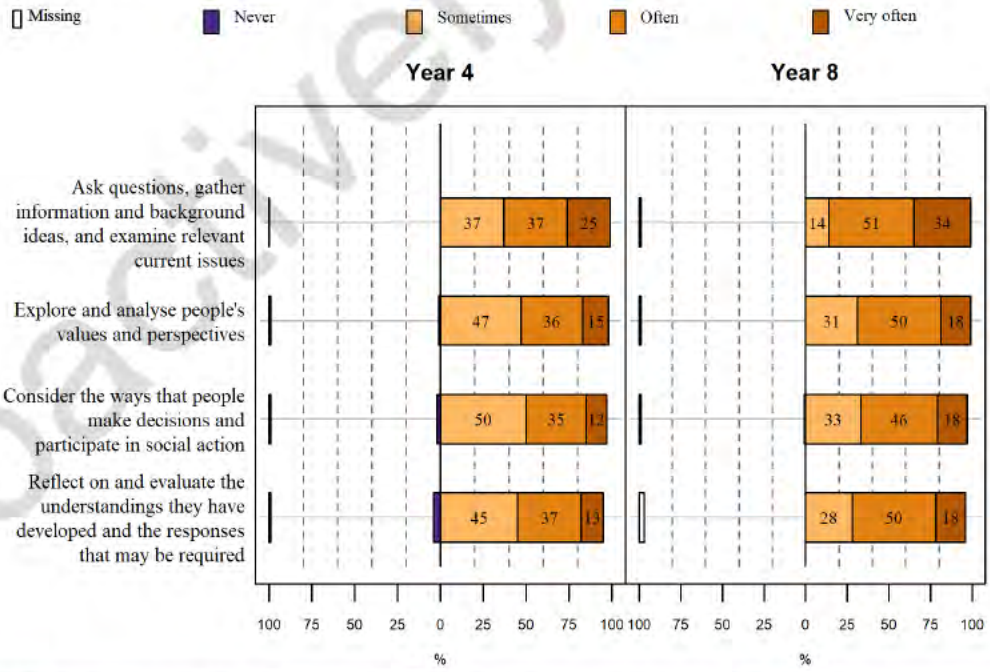


Figure 4.10 Percentage of teachers reporting how often they used elements of the social inquiry approach to learning social studies, by year level

Most teachers felt confident teaching students to use a social inquiry approach

Seventy-six percent of teachers at Year 4 felt 'moderately' or 'very confident' to teach students to use a social inquiry approach compared to 88 percent at Year 8 (Figure 4.11).

However, fewer Year 4 teachers from low decile schools reported this level of confidence (68 percent) compared with teachers from high decile schools (83 percent).

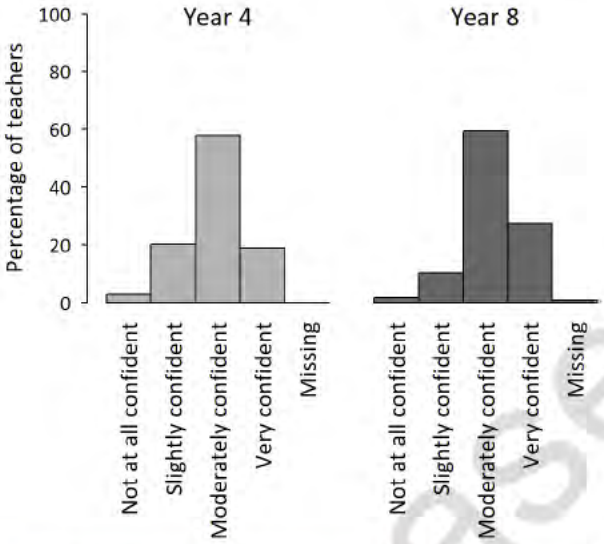


Figure 4.11 Percentage of teach epo ng their level of confidence to t ach s udents a social inquiry pro ess, b y ar lev l

Teachers' attitudes to social studies

Almost all teachers had positive attitudes about teac ing social studies

Almost all of the teachers indicated that they personal enjoyed social studies, liked teaching it, and thought it was an important learning area to teach (Figure 12). Year 8 teachers were more likely than Year 4 teachers to respond using 'strongly agree

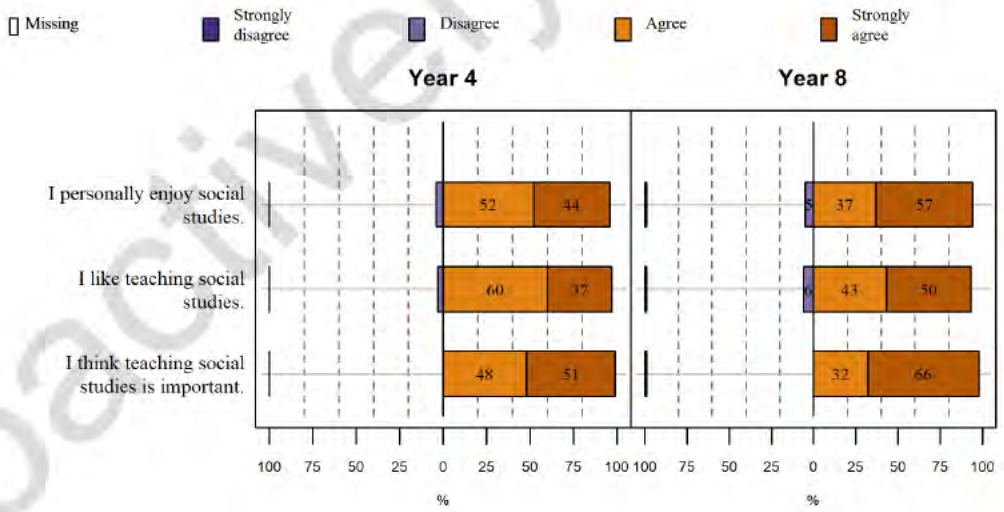


Figure 4.12 Percentage of teachers' responses to statements regarding their attitudes to social studies, by year level

Looking back

In 2014, teachers were asked how much they enjoyed the social studies learning area and how much they liked teaching social studies. Their responses were very similar to those of teachers in 2018.

Teachers' confidence in teaching social studies

Most teachers were confident as social studies teachers

Most teachers used the 'agree' and 'strongly agree' categories to indicate how strongly they agreed to eight statements related to their confidence in teaching social studies (Figure 4.13). At both year levels, the highest level of agreement was to the first two statements: 'I integrate social studies learning with other curriculum areas or themes' and 'I draw on students' backgrounds and previous experiences to support their learning in social studies'.

However, between 10 to 20 percent of Year 4 and Year 8 teachers disagreed that they could 'provide an effective and inclusive social studies programme for students who need learning support', 'had the necessary knowledge and skills to teach ALL students', and 'plan social studies lessons to match students' individual needs'.

For all of the statements, Year 8 teachers were more likely to respond using the 'strongly agree category than teachers at Year 4.

About 20 percent of teachers at each year level indicated they were generally not satisfied with their teaching

Twenty-one percent of Year 4 teachers and 17 percent of Year 8 teac ers di agreed' or 'strongly disagreed' that they were 'generally satisfied with how they teach ocia studi s'.

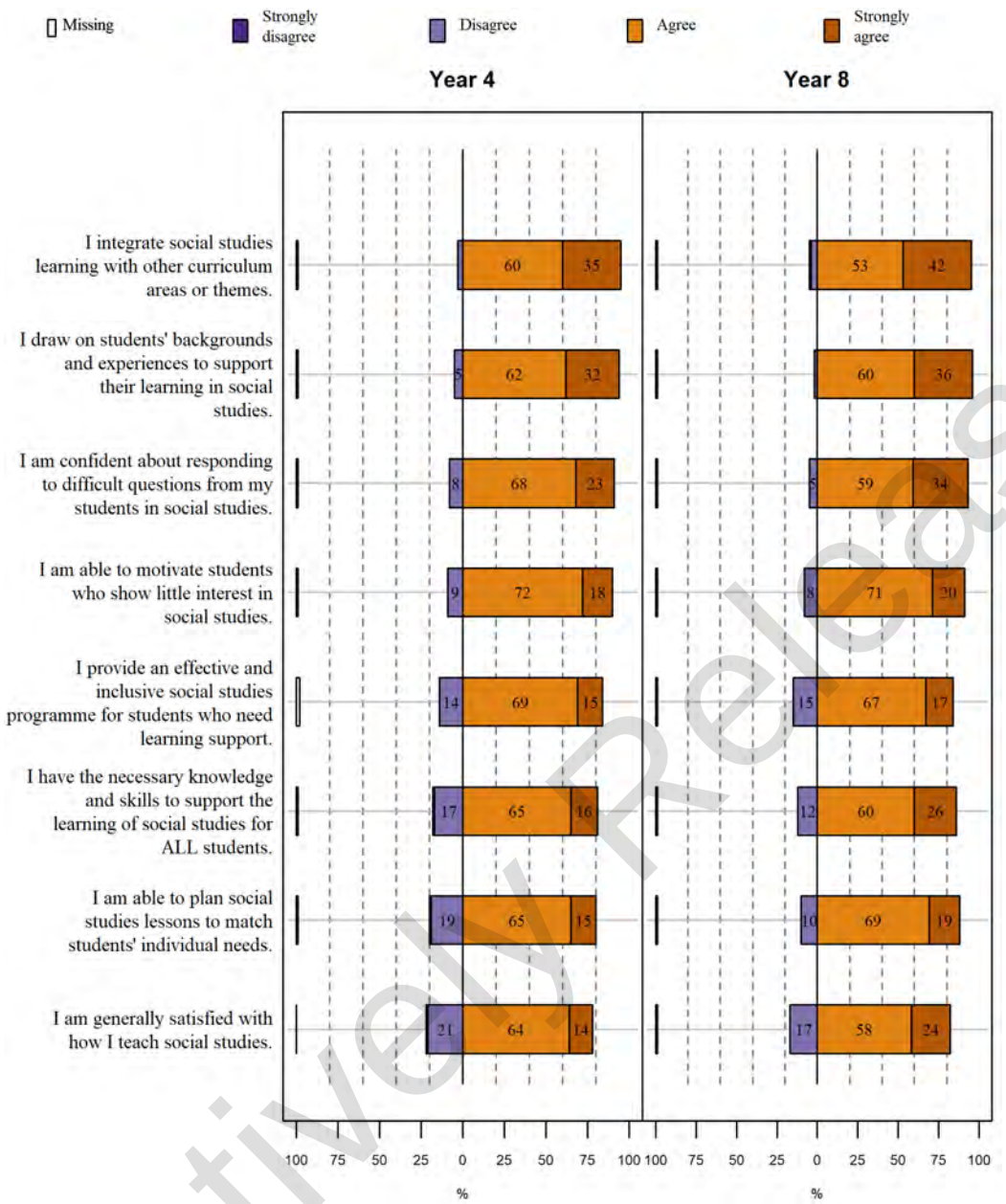


Figure 4.13 Pe centage of e chers' responses to statements regarding their confidence in teaching s cial studies, by year level

Confidence in Teaching Social studies scale

Teachers' responses to the eight confidence statements were used to construct a Confidence in Teaching Social Studies scale[20]. The scale was divided into 'very confident', 'confident' and 'not confident' score regions. Figure 4.14 presents the distributions of Confidence in Teaching Social Studies scale scores for Year 4 and Year 8 teachers.

Year 8 teachers were more confident about teaching social studies than Year 4 teachers

Teachers of Year 8 students scored higher on the Confidence in Teaching Social Studies scale, on average, than those teaching at Year 4 (102 compared to 98 scale score units).

At Year 4, teachers from high decile schools scored higher, on average, on the Confidence in Teaching Social Studies scale than those from mid and low decile schools (102 compared to 95 and 94 scale score units for mid and low decile schools).

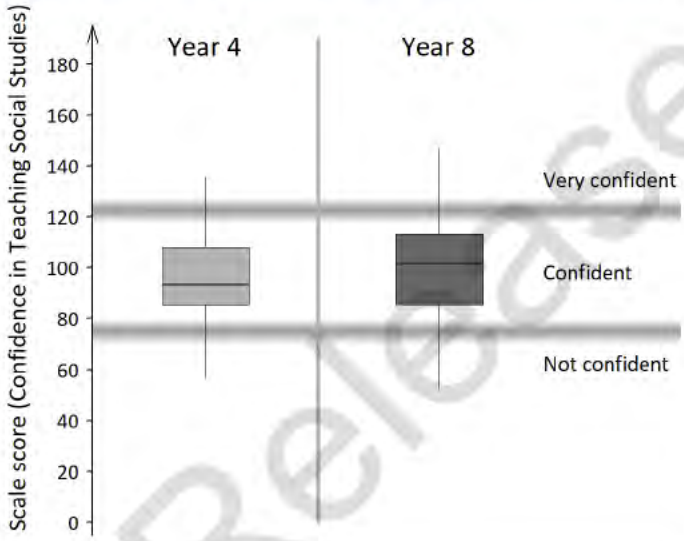


Figure 4.14 Distrib on of teachers' scores on the Confidence to Teach Social Stu es scale, by year level

Most teachers were confident teaching he conceptual strands in social studies

The vast majority of teachers reported that hey felt ither 'moderately confident' or 'very confident' teaching each of the social studies tran s (Figure 4.15). They were least confident teaching the strand: economic world. Year 8 teacher we more likely to respond with 'very confident' than Year 4 teachers.

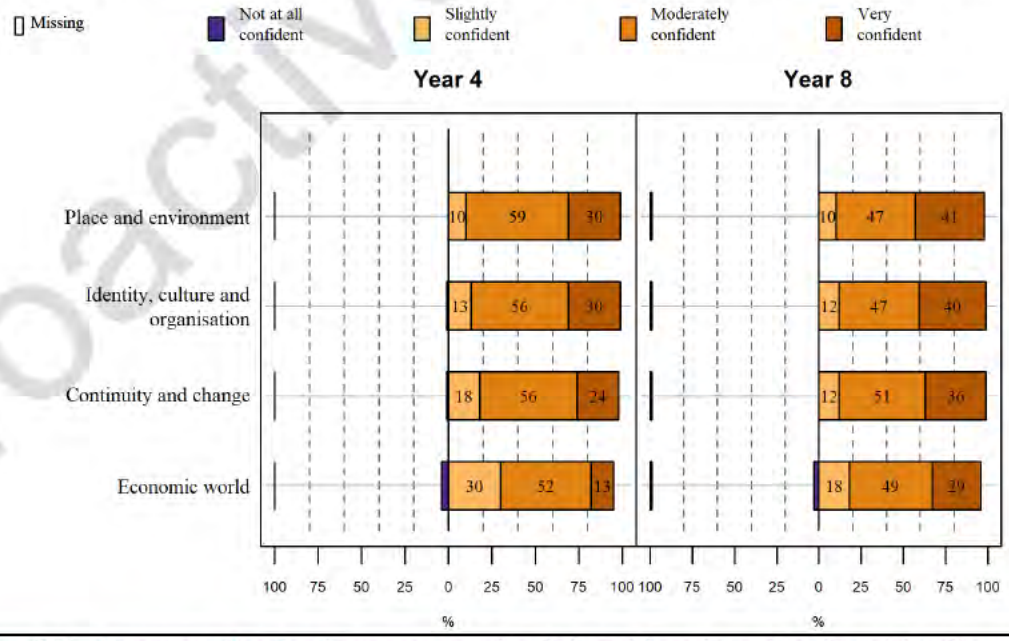


Figure 4.15 Percentage of teachers' responses regarding their confidence in teaching the social studies conceptual strands, by year level

[20] 2018 is the first year that NMSSA constructed measurement scales based on teachers' responses.

Looking back

The majority of teachers in 2018 and 2014 expressed similar levels of confidence about teaching social studies. However, there were differences in response to some items.

Compared with teachers in 2014, teachers in 2018:

- were more likely at Year 8 to draw on students' backgrounds and experiences to support their learning in social studies (98 percent in 2018 compared to 86 percent in 2014)
- were less confident at Year 4 about having the necessary knowledge and skills to teach social studies to a diverse range of students (71 percent in 2018 compared to 86 percent in 2014)
- were more confident at Year 4 about being able to plan social studies lessons to match individual students' needs (91 percent in 2018 compared to 80 percent in 2014).

Opportunities provided for students to learn social studies

Teachers were presented with a series of statements that described different learning oppor unit es in social studies. They were asked to indicate how often students in their class had each experie ce at chool.

Teachers reported that students often experience learning opportunitie in social studies

Generally, all teachers indicated that each opportunity happened at least 's metimes' (Figure 4.16). The opportunity reported as occurring most frequentl ('oft n' or very often') was 'students participating and contributing in groups'; the one rep rted a occur i g least frequently was 'students having opportunities to participate in social action on sues of in st and relevance to them at school'.

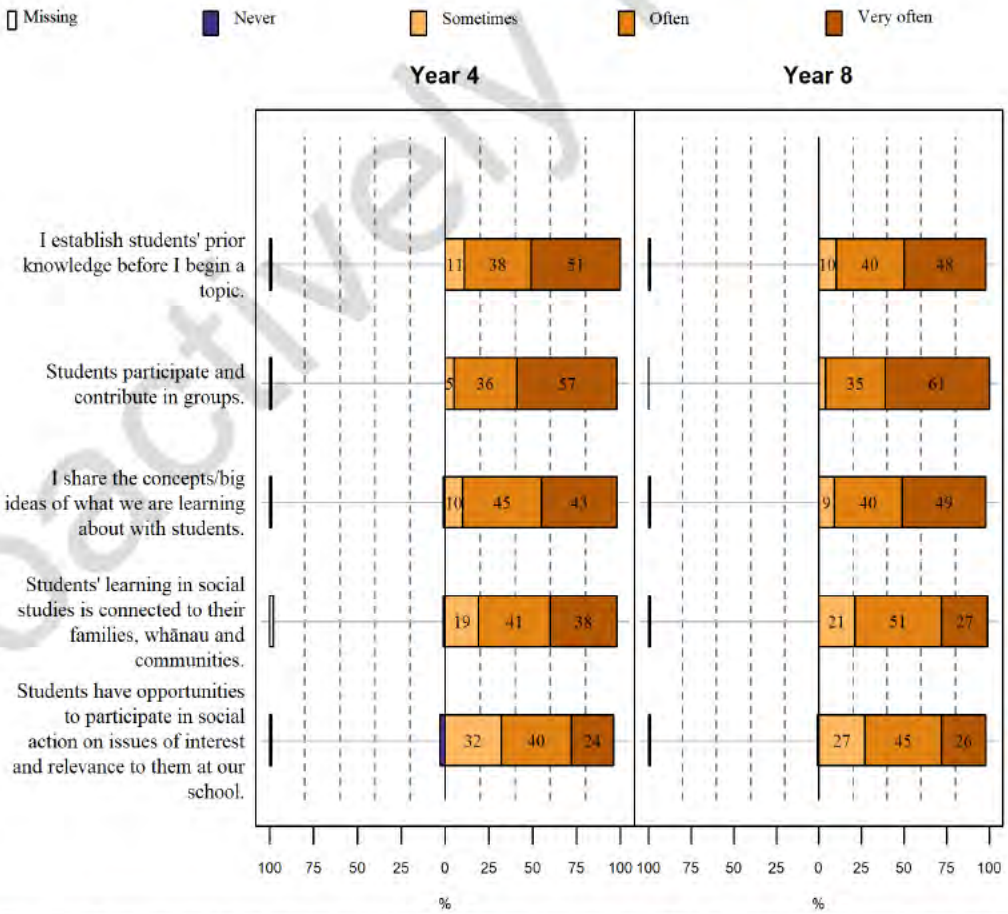


Figure 4.16 Percentage of teachers' responses regarding opportunities for students to learn social studies, by year level

Teachers and students sometimes differed in how often learning opportunities occurred

In general, teachers tended to report that students experienced learning opportunities more frequently than the students themselves reported. Table 4.5 shows the learning opportunities that teachers and students differed most markedly in the percentage who reported them as occurring 'often' and 'very often'. Differences greater than 20 percentage points are noted. The most pronounced difference was at Year 4 relating to 'establishing what is already known about a topic'.

Table 4.5 The most discrepant differences between the percentage of teachers and students responding to opportunities for learning social studies 'often' or 'very often', by year level

	Year 4			Year 8		
	Teacher %	Student %	Diff %	Teacher %	Studen %	Diff %
Establish what is already known about a topic	89	47	42	-		
Learn about things related to family, whānau and community	78	50	28	77	53	*24*
Talk about the big ideas they are learning about	88	64	24	-	-	
Use digital devices or the Internet to learn new things	79	57	22		-	

Looking back

In 2014, teachers rated how frequently their studen s expe enced each of a similar list of learning opportunities in social studies using a different sc le: never , rarely', 'sometimes', 'often' and 'always'. Where the statements described the same or sim lar opportunities, teachers in 2018 responded 'never' at a similar rate to teachers in 2014.

Digital devices are frequently used in social studies learning

The vast majority of teachers reported that students 'often' or 'very often' used digital devices or the Internet to explore new learning environments and access resources, especially at Year 8 (see Figure 4.17).

Use of devices to 'connect with other people beyond the school' was the least frequently reported opportunity. At Year 4, about 17 percent of teachers from high decile schools reported their students 'never' had this opportunity compared with 33 percent of teachers from low decile schools.

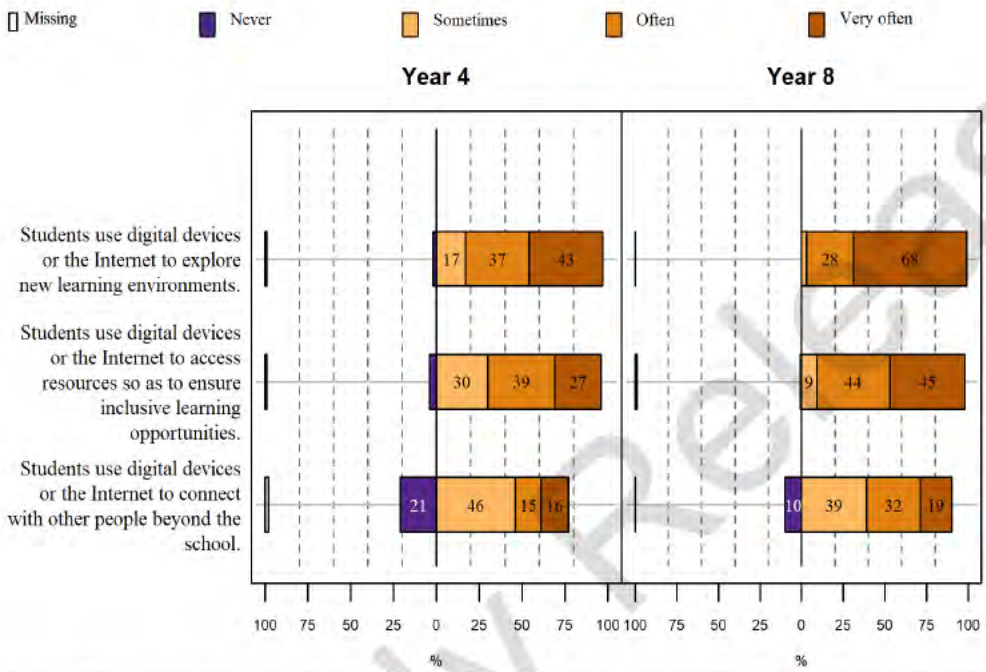


Figure 4.17 Percentage of teachers' response regarding pportunities for students to use digital devices or the Internet to lea n socia studies, y year level

Teachers' assessment practices

Teachers were asked to indicate how frequently they undertook a range of assessment activities in the classroom (Figure 4.18).

Almost all teachers gathered and used assessment information at least sometimes

More than 90 percent of teachers at Year 4 and Year 8 indicated that they used assessment for a range of purposes. Informal processes, such as 'talking with students about their progress', and 'supporting students to self assess' were the most commonly used processes.

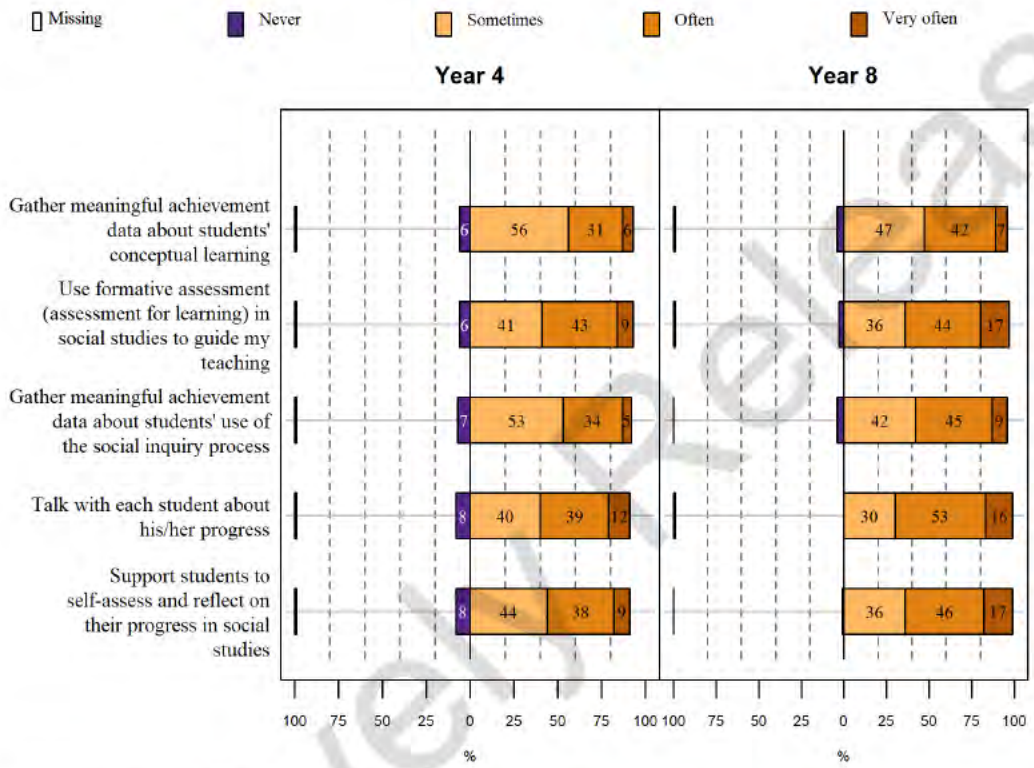


Figure 4.18 Percentage of teach s' esponses regarding gathering and using assessment information, by year le el

Access to resources for teaching social studies

The majority of teachers agreed they had access to the necessary resources to support the learning of all students in social studies

The majority of teachers 'agreed' or 'strongly agreed' that they had access to the necessary resources to support the learning of all students in social studies (Year 4: 69 percent; Year 8: 73 percent) (Figure 4.19). However, there remained a sizable percentage of teachers who disagreed.

At Year 4, notably more teachers from high decile schools (76 percent) agreed they had access to the necessary resources compared to teachers from low and mid decile schools (66 and 64 percent, respectively).

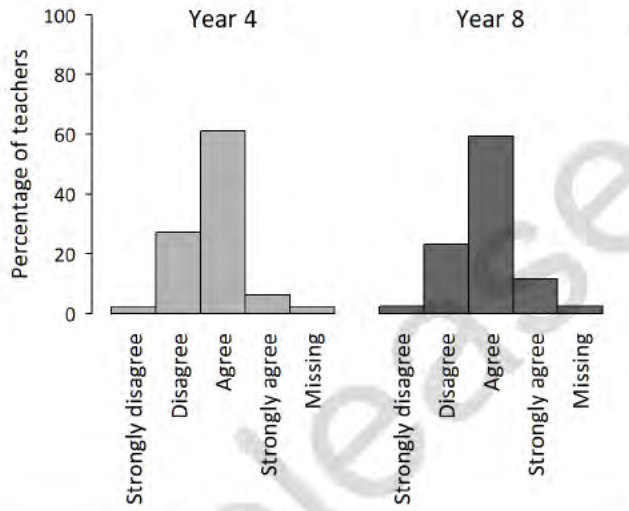


Figure 4.19 Percen age o teachers' responses regarding ess the nec ssary resources to support the lea ning o ll s udents in social studies, by year le el

Professional support for teaching soc al studies

Half of the teachers had received profession learning and development (PLD) in social studies within the last five years

About half of the teachers at both year levels reported that they had participated in PLD in social tudies within the last fiv year (Figure 4.20). About 26 percent of te chers indicated that they had n er been involved in social stud s PLD.

Looking bac

In 2014, a s milar proportion of teachers at Year 4 and Year 8 (55 p rcent reported that they had participated in PLD associated with ocial studies within the last five years.

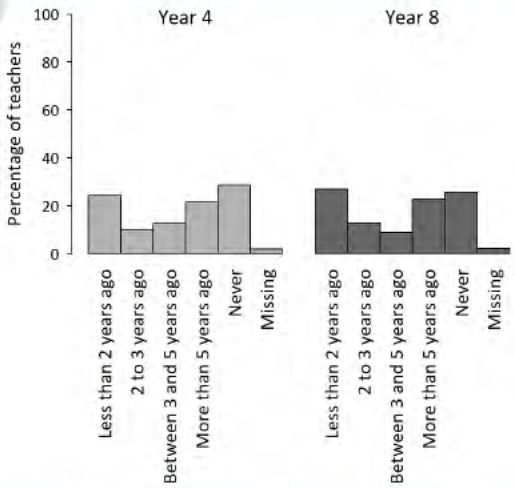


Figure 4.20 Percentage of teachers who had participated in PLD associated with social studies, by year level

Most teachers reported having professional interactions with colleagues about teaching social studies at least twice a year

About 60 percent of teachers indicated that, at least twice a year, they worked with other teachers to discuss and plan for social studies teaching, learning and assssment for their students (Figure 4.21). However, about half of the teachers at both levels had 'never' observed a colleague teaching social studies. NMSSA studies in other curriculum areas have also indicated limited opportunities for teachers to observe their colleagues.

Generally, teachers from high decile schools reported more professional interactions than those from mid or low decile schools.

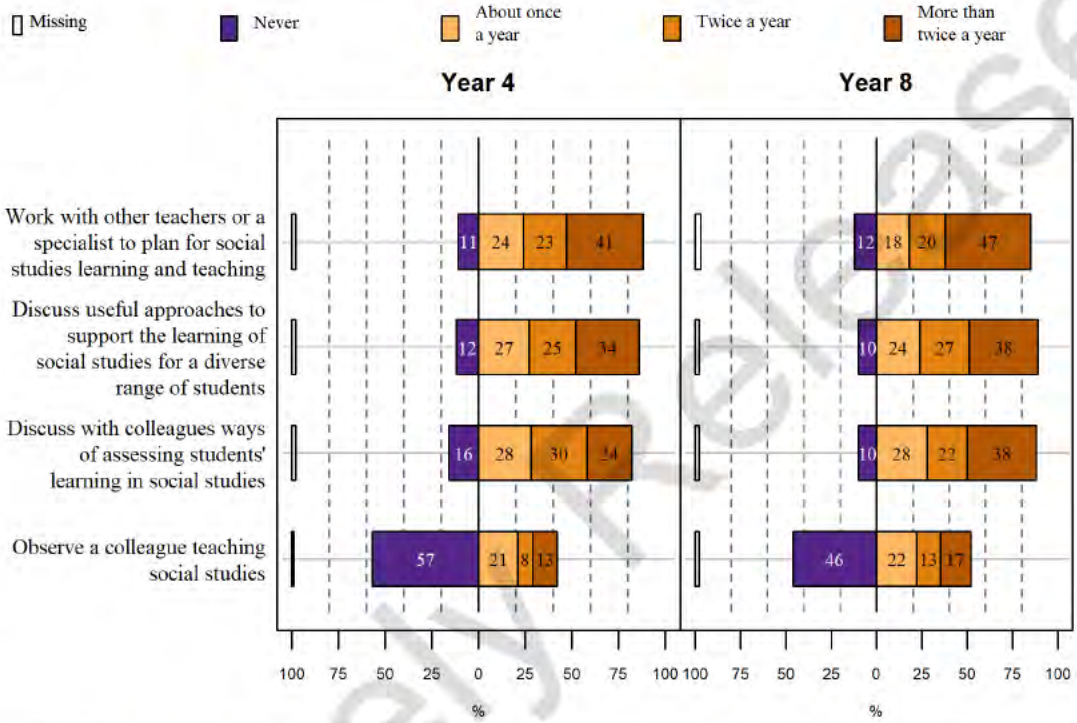


Figure 4.21 Percentage of teach s' r onses egarding professional interactions, by school decile band and year level

Looking back

In 2014, teachers al o rated how frequently they were involved in a similar list of professional interactions. Th finding were similar to those of 2018.

Teachers' ove all ratings of professional support for teaching social studies were mixed

While p to a hird of teachers rated th profes ional support they received for soc al studies as 'good' or 'very good', most teachers were less positive. Approximately two thirds of the teachers categorised their professional support as 'fair' or 'poor' (Figure 4.22).

Overall, teachers at Year 8 tended to rate their level of professional support slightly more positively than teachers at Year 4.

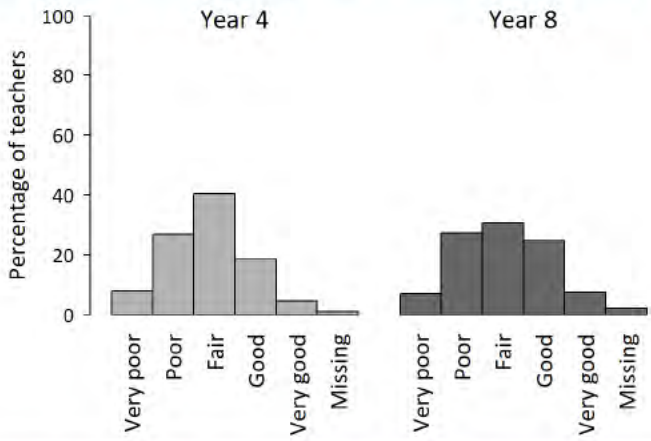


Figure 4.22 Percentage of teachers ratings of the professional support they received for teaching social studies, by year level

Most teachers accessed TKI Social Studies Online to support their teaching of social studies

About three quarters of teachers at both Year 4 and Year 8 accessed the TKI Social Studies Online on the Ministry of Education website (Figure 4.23). Informal support was next most prevalent, with 40 percent of teachers indicating that they accessed Facebook or other online group support for their social studies teaching. Most of the 'other' supports accessed were also digital. Very few teachers attended social studies conferences, or were members of the Social Studies Association.

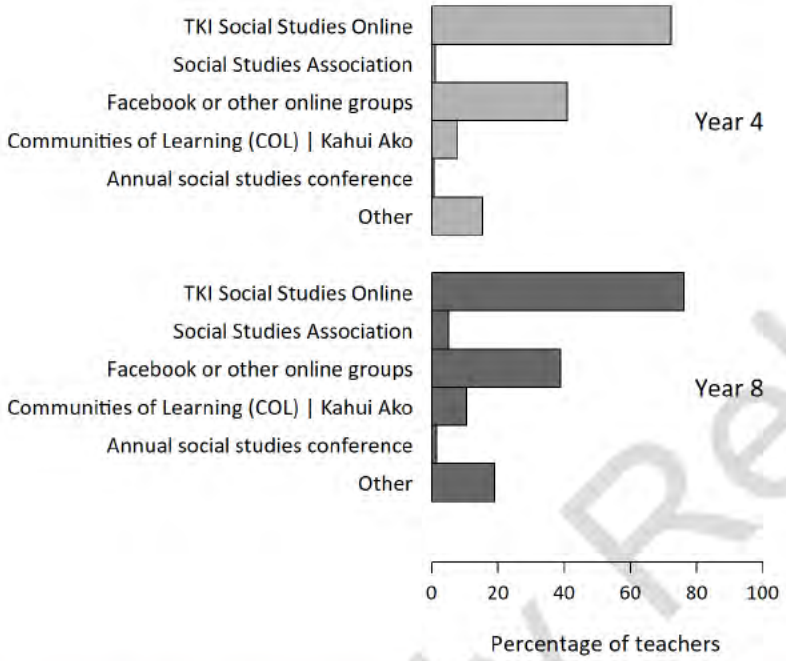


Figure 4.23 Percentage of teachers accessing r sources to support their teaching of social studies, by year le el

3. Principals' views on le rning and teaching social studies

All principals from the schools in the NMSSA social studies study were asked to complete a principal questionnaire. Table 4.6 shows th percentage of principals who responded by school decile band and year level.

Table 4.6 Perce tage f princ pals who responded to the questionnaire, by school decile band and year level

	Percentage of Principals	
Decile nd	**Year 4 (*N=93*)**	**Year 8 (*N=91*)**
Low	24	22
Mid	37	37
H h	40	41

Note Differences between schools by decile were examined and due to the relatively small sample sizes of principals in each decile only notable differences that were consistent at Year 4 and Year 8 are reported.

Learning and teaching in social studies

The majority of principals reported that their school had policies and practices in place related to curriculum and reporting in social studies

About 60 percent of principals at Year 4 and 70 percent at Year 8 indicated that they had 'clear progressions of learning', 'guidelines outlining assessment strategies for student progress', and 'a comprehensive plan for social studies implementation' (Figure 4.24).

However, notably fewer principals reported processes for the 'systematic collation and analysis of information on student achievement to inform curriculum review and resourcing decisions in social studies', or 'charter goals related to student learning in social studies'. The two statements in Figure 4.24 related to these concerns stood out, with about a third of principals at Year 4 and a quarter Ye r 8 describing them as 'not at all like our school'.

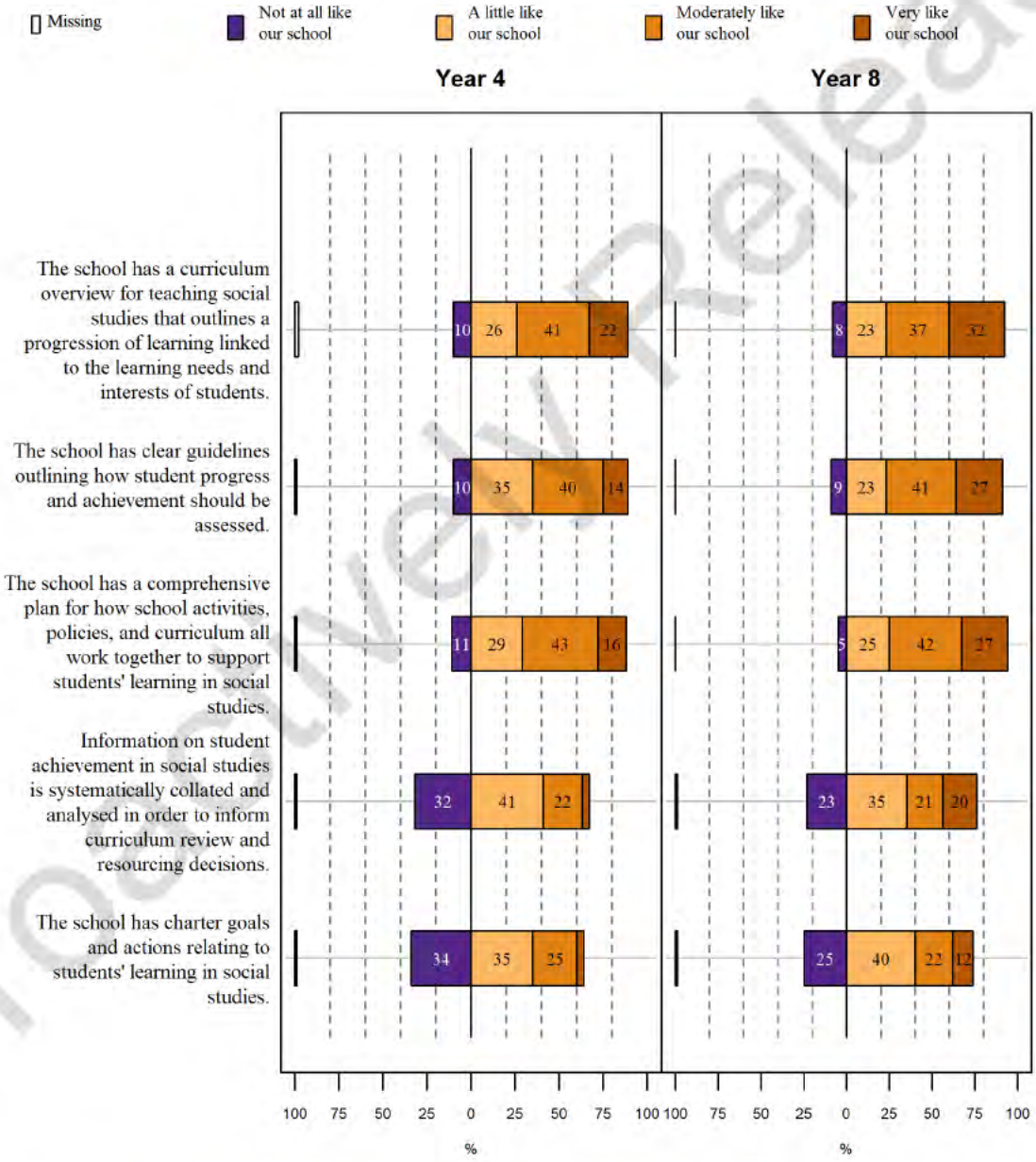


Figure 4.24 Percentage of principals' descriptions of statements related to curriculum and reporting policies and practices in social studies, by year level

Year 8 principals were more positive than Year 4 principals about the practices in their schools that support teaching and learning in social studies

Principals were asked to decribe how well practices that support teaching and learning in social studies reflected what happened in their school. Generally, the majority of principals reported that these practices were 'moderately' or 'very like their school' (Figure 4.25). The exception was at Year 4, where about half of the principals reported that 'having school leaders and teachers engage in ongoing dialogue about effective practice in social studies' was 'not at all' or 'a little like our school'.

The proportions of Year 8 principals indicating that the statements relating to teaching and learning approaches were 'moderately' or 'very like their school' were greater than those at Year 4, particula ly in relation to 'teachers responding effectively to the social studies learning needs of all students (89 percent at Year 8 compared with 57 percent at Year 4). The difference between low and high d ile schools was notable here (68 percent compared with 84 percent).

The majority of principals were reasonably confident that their teachers p ovided effective programmes for their students in social studies

More than half of the school principals of Year 4 students, and two third to three quarters of the principals of the Year 8 students used 'moderately' or 'very like our school to rate statements regarding 'teachers having appropriate pedagogical and content knowledge in so ial st dies' and 'being able to respond effectively to the social studies learning needs of ll students', ncluding 'those who needed additional learning support' (Figure 4.25).

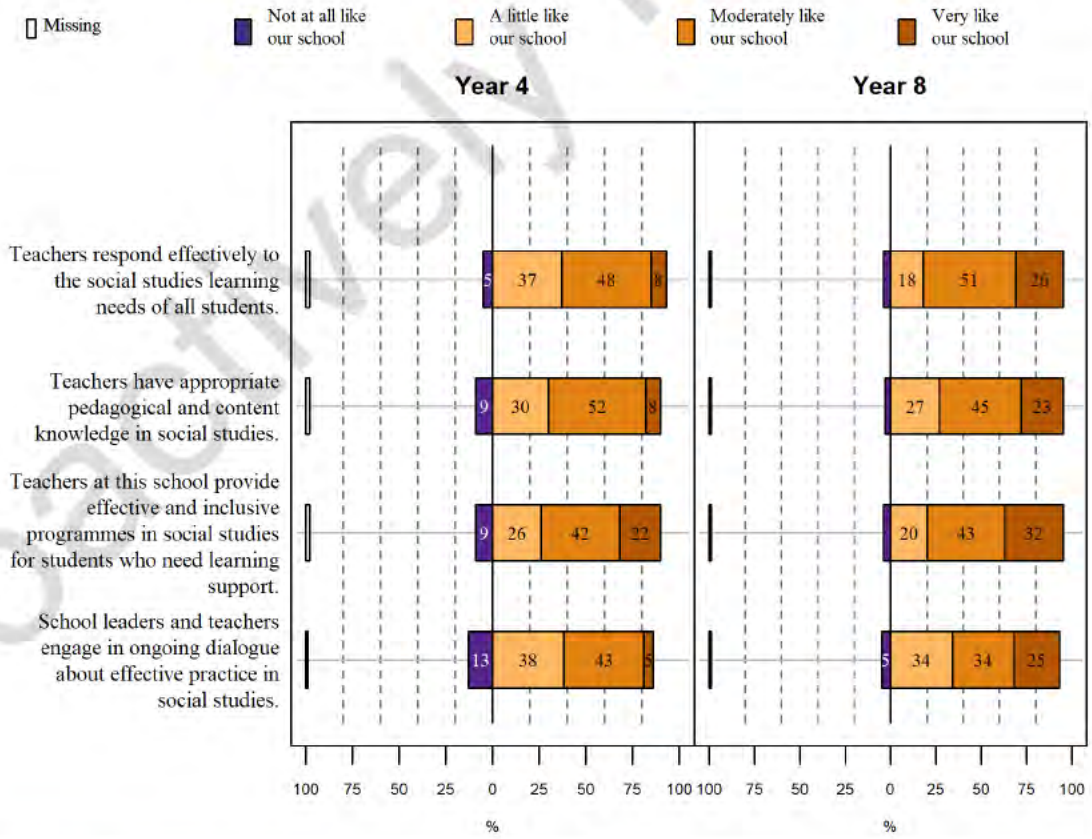


Figure 4.25 Percentage of principals' responses describing practices that support teaching and learning in social studies, by year level

Resourcing in social studies

Most principals reported that their school was well resourced to allow all students to be fully involved in social studies

About 80 percent of principals at both year levels reported that their school 'had sufficient equipment and resources to allow all students to be fully involved in social studies' ('moderately or 'very like our school') (Figure 4.26).

A smaller proportion of principals (about 60 percent) reported that 'teachers with leadership responsibilities had appropriate support'.

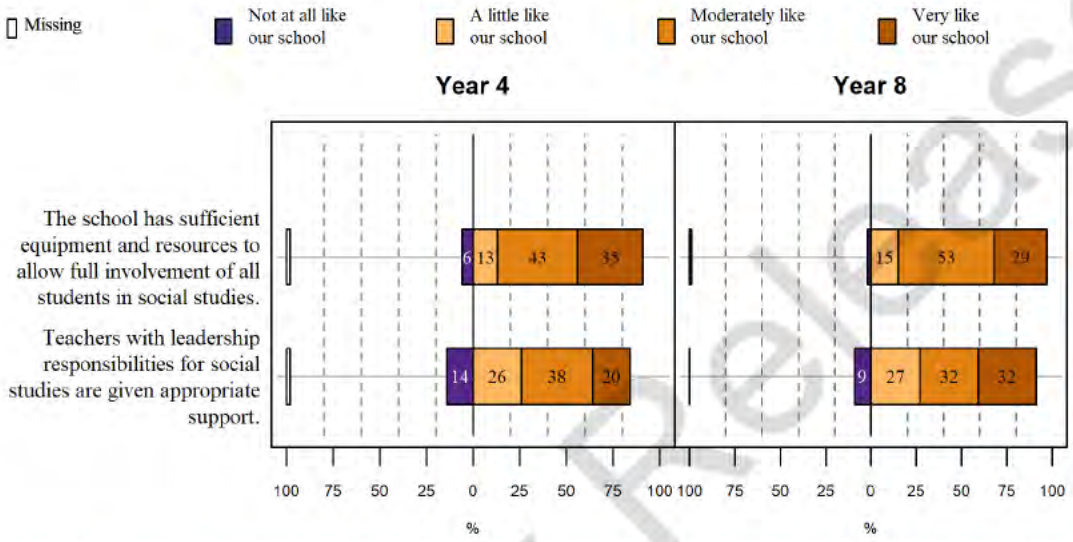


Figure 4.26 Percentage of principals' ratings of statem nts related to resourcing in social studies, by year level

Year 8 principals rated their school s overall p ovision for students' learning in social studies higher than Yea 4 rin pals

Principals were asked to rate he overall provision for social studies in th ir school (Figure 4.27). At Year 8 65 percent of principals rated it as e ther good' or 'very good' compared with 48 percent of those at Year 4. A grea r prop rtion of principals at Year 8 rated it as very good' (21 percent) compared with hose at Year 4 (4 percent).

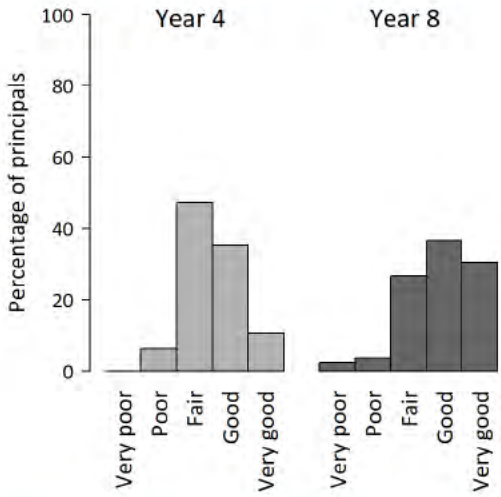


Figure 4.27 Percentage of principals' ratings of their school's overall provision for learning in social studies, by year level

Looking back

In 2014, principals were also asked to rate the overall provision for students' learning in social studies using a 5-point scale: 'poor', 'fair', 'good', 'very good' and 'excellent'. Allowing for the use of a different rating scale in 2018, a similar percentage of principals rated their school's provision in the top two categories.

Communicating about students' learning

Principals provided mixed reports regarding the extent to which information about achievement and progress in social studies was communicated to a range of stakeholders. Overall, principals at Year 8 indicated more communication than those at Year 4

More than half of the principals at Year 8 indicated that their 'teachers talked frequently with students about their progress in social studies' (59 percent), 'the school engaged with parents and whānau, students and the Board of Trustees about students' learning in social studies' (54 percent), and provided parents and whānau with clear information about their child's progress and achievement (61 percent) The corresponding figures at Year 4 were lower (Figure 4.28).

The converse picture that emerged was that at least 60 percent of principals at Year 4 and 40 p rcen at Year 8 reported that the statements regarding communication about student learning we e no r ally indicative of their school.

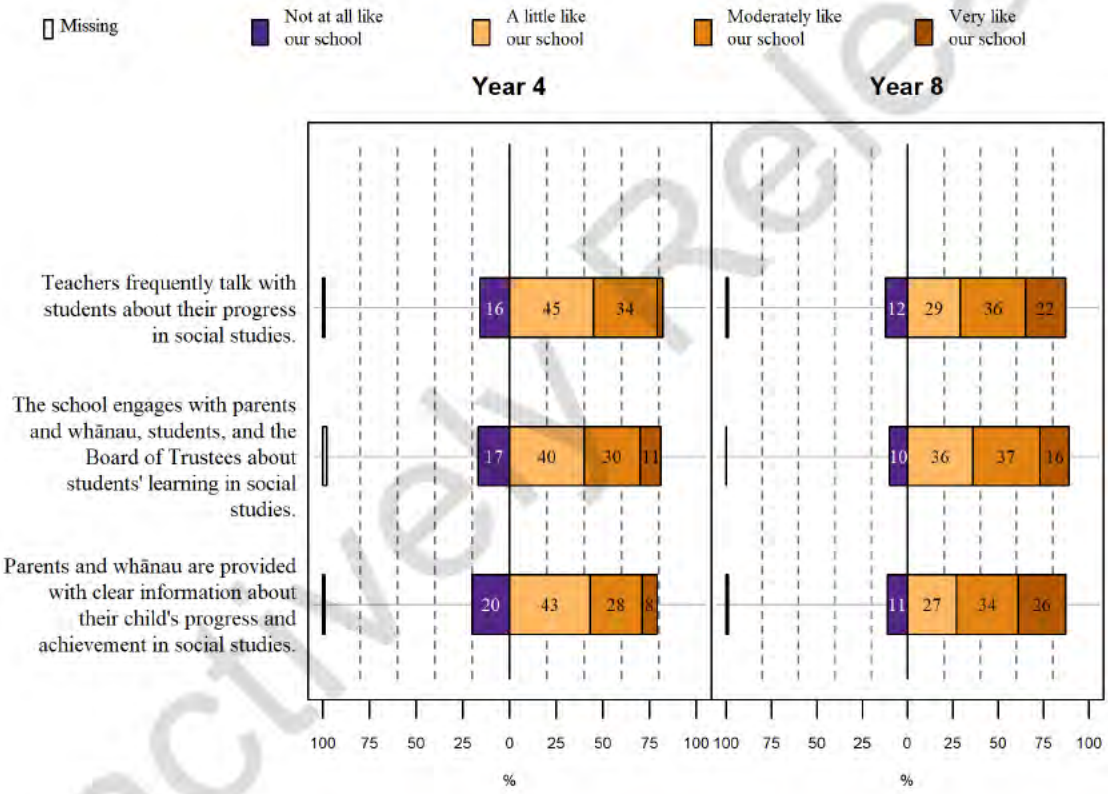


Figure 4.28 Per entage of principals' ratings of statements related to communicating about student achievement d progress in social studies, by year level

Professional support in social studies

Overall, principals reported that teachers' access to professional learning and development in social studies was limited

Sixty-four percent of principals at Year 4 and 48 percent at Year 8 indicated that their teachers had either 'no access' or 'little access' to PLD in social studies (Figure 4.29).

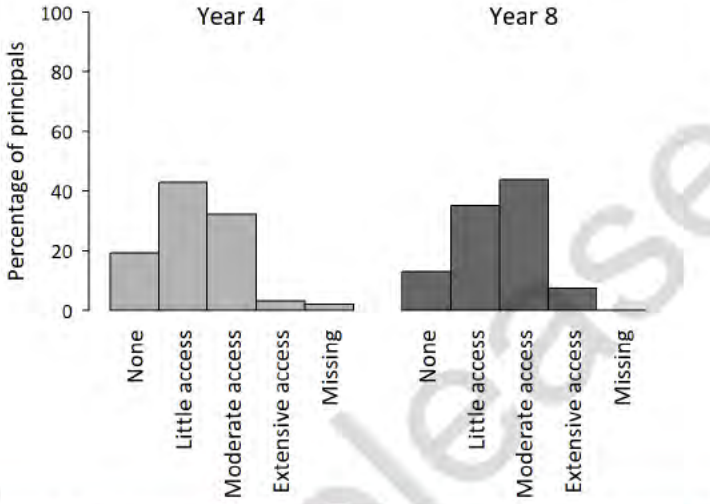


Figure 4.29 Percentage of pri cipal ratings of their teachers' access to professi learn g and d velopment in social studies, by year evel

Social studies had not been a focus for development in the last five years for over half of the schools

Sixty-four percent of principals at Year 4 and 57 percent at Year 8 indicated tha social studies had not been a focus for development at their school in the l st 5 years (Figure 4.30). In fact, it had een a major focus in fewer than 10 p rcent of schools.

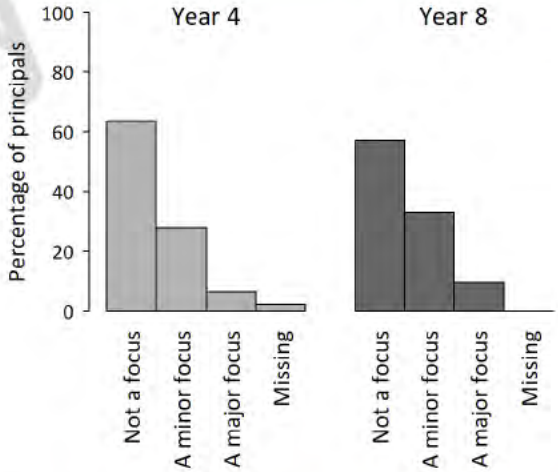


Figure 4.30 Percentage of principals' ratings about social studies being a focus for development in the last 5 years, by year level

Appendix: Summary Statistics

Tables:

Notes:

Reporting of statistics

The following tables report a range of statistics associated with the 2018 NMSSA social studies study. Statistics for a population subgroup are not reported when the subgroup is represented by fewer than 42 students.

95% confidence intervals

The tables show the 95 percent confidence intervals associated with the mean scores and the differences between mean scores reported in the tables. The intervals provide a range within which we can be fairly sure the population value for the reported statistic lies. The confidence intervals have been adjusted (widened) to account for any design effect associated with NMSSA's sampling approach (i.e. sampling schools and hen sampling students).

Effect sizes

Effect sizes are also reported in the following tables of statistics. An effect size quan ifie th difference between the average scores for two groups in terms of standard deviation unit Beca se the standard deviation can vary from group to group, this can mean that the same differe ce in scale scores can be associated with a different effect size for one pair of groups compared with noth r. When comparing two effect sizes it is very important to refer back to the scale score differences to m ke sure any interpretations are valid.

The formula for the effect size calculation is: $\frac{M \quad M_2}{\sqrt{\frac{(n \; - \;)s^2 + (n \quad)s_2^2}{n \; + n_2 - 2}}}$, wh re M_1 d M_2 represent the average

scores for group 1 and group 2, s_1 and s_2 their standard deviations, and n_1 and n_2 the number in each group.

Table A1.1 Achievement on the NSS Scale: Summary statistics for Year 4 students

Group	Sample size	Mean	Confidence interval for the mean	Standard deviation
All	1195	80.3	(78.9 , 81.7)	20.3
Gender				
Girls	574	82.7	(80.7 , 84.7)	20.3
Boys	621	78.1	(76.2 , 80.0)	20.2
Ethnicity				
Māori	268	72.5	(69.5 , 75.5)	20.5
Pacific	154	69.3	(65.4 , 73.2)	20 3
Asian	143	83.3	(79.6 , 87.0)	18.7
NZE	772	84.7	(83.1 , 86.3)	18 6
Special education needs				
SEN	105	65.2	(60.5 , 69)	20.0
Decile band				
Low decile	291	69.7	(67 0 , 72 4)	19.8
Mid decile	438	79.0	(6.8 , 81 2)	19.4
High decile	466	88	(86 , 90.1)	18.3
School type				
Contributing school	746	79	(77.8 , 81.4)	20.9
Full primary school	413	81.0	(78.7 , 83.3)	19.6

Table A1.2 Achievement on the NSS Scale: Summary s atistics for Year 8 students

Group	Sample ze	Mean	Confidence interval for the mean	Standard deviation
All	1182	119.7	(118.4 , 121.0)	19.6
Gender				
Girls	569	123.7	(121.8 , 125.6)	19.4
Boys	613	116.1	(114.3 , 117.9)	19.2
Ethnicity				
Māori	288	111.5	(108.9 , 114.1)	18.5
Pacific	148	109.8	(105.8 , 113.8)	20.6
Asian	129	124.1	(120.0 , 128.2)	19.5
ZE	725	123.1	(121.5 , 124.7)	18.1
Spe ial educ tion needs				
SEN	48	102.9	(96.1 , 109.7)	19.3
D cile band				
Low decile	271	109.1	(106.3 , 111.9)	19.3
Mid decile	439	118.7	(116.6 , 120.8)	18.8
High decile	472	126.8	(124.9 , 128.7)	17.6
School type				
Full primary school	468	120.1	(117.9 , 122.3)	19.8
Intermediate school	502	118.8	(116.7 , 120.9)	19.8
Secondary school (Year 7-15)	141	123.8	(120.2 , 127.4)	17.9
Composite school (Year 1-15)	47	111.9	(105.0 , 118.8)	19.5

Table A1.3 Achievement on the NSS Scale: Differences between subgroup means for Year 4 students

Subgroup 1	Sample size subgroup 1	Subgroup 2	Sample size subgroup 2	Difference in means*	CI for the difference in means	Effect size
Gender						
Girls	574	Boys	621	**-4.6**	(-6.5 , -2.7)	-0.23
Ethnicity						
Māori	268	Non-Māori	927	**10.0**	(7.7 , 12.3)	0.50
Pacific	154	Non-Pacific	1041	**12.6**	(9.7 , 15.5)	0.63
Asian	143	Non-Asian	1052	**-3.4**	(-6.2 , -0.6)	-0.17
NZE	772	Non-NZE	423	**-12.5**	(-14.5 , -10.5)	- 64
Special education needs						
SEN	105	No SEN	1090	16.5	(13.1 , 19.9)	0 3
Decile band						
Low decile	291	Mid decile	438	**9.3**	(6.9 11.7)	0.48
Low decile	291	High decile	466	**18.4**	(16 0 , 2 8)	0.97
Mid decile	438	High decile	466	**9 1**	(7.0 , 1.2)	0.48
School type						
Contributing school	746	Full primary school	413		(-0.6 , 3.4)	0.07

* Differences in means in bold font are statistically significant

Table A1.4 Achievement on the NSS Scale: Differences b tween subgroup means for Year 8 students

Subgroup 1	Sample size subgroup 1	Subgroup 2	Samp size subgrou 2	Difference in means*	CI for the difference in means	Effect size
Gender						
Girls	569	Boys	613	**-7.6**	(-9.4 , -5.8)	-0.39
Ethnicity						
Māori	288	Non Māor	894	**10.9**	(8.8 , 13.0)	0.57
Pacific	148	Non- cific	1034	**11.3**	(8.4 , 14.2)	0.59
Asian	129	Non-Asian	1053	**-4.9**	(-7.9 , -1.9)	-0.25
NZE	725	N n NZE	457	**-8.8**	(-10.7 , -6.9)	-0.46
Special education needs						
SEN	48	No SEN	1109	**17.6**	(12.9 , 22.3)	0.91
Decile band						
Low decile	271	Mid decile	439	**9.6**	(7.2 , 12.0)	0.51
Low decile	271	High decile	472	**17.7**	(15.4 , 20.0)	0.97
Mid decile	439	High decile	472	**8.1**	(6.1 , 10.1)	0.45
Schoo type						
Full rimary s hool	468	Composite school	47	**-8.2**	(-13.1 , -3.3)	-0.41
Full prim y school	468	Intermediate school	502	-1.3	(-3.4 , 0.8)	-0.07
Ful primary school	468	Secondary school (Year 7-15)	141	**3.7**	(0.8 , 6.6)	0.19
Composite school (Year 1-15)	47	Intermediate school	502	**6.9**	(2.0 , 11.8)	0.35
Composite school (Year 1-15)	47	Secondary school (Year 7-15)	141	**11.9**	(6.6 , 17.2)	0.65
Intermediate school	502	Secondary school (Year 7-15)	141	**5.0**	(2.1 , 7.9)	0.26

* Differences in means in bold font are statistically significant

Table A1.5 Achievement on the NSS Scale: Differences between means for Year 4 and Year 8 by subgroup

Group	Year 4 sample size	Year 8 sample size	Year 8–Year 4 difference in means*	CI for difference in means	Effect size
All	1195	1182	**39.4**	(38.1 , 40.7)	1.97
Gender					
Girls	574	569	**41.0**	(39.1 , 42.9)	2.06
Boys	621	613	**38.0**	(36.2 , 39.8)	1.93
Ethnicity					
Māori	268	288	**39.0**	(36.3 , 41.7)	2.0
Pacific	154	148	**40.5**	(36.6 , 44.4)	1.98
Asian	143	129	**40.8**	(36.9 , 44.7)	2 14
NZE	772	725	**38.4**	(36.8 , 40.0)	2 09
Special education needs					
SEN (combined)	105	48	**37.7**	(31 0 , 4 4)	1.91
Decile band					
Low decile	291	271	**39.4**	(36.6 , 2.2)	2.01
Mid decile	438	439	**39.7**	(37.6 , 41.8)	2.08
High decile	466	472	**38.7**	(36.8 , 40.6)	2.16

* Differences in means in bold font are statistically significant

Table A1.6 NSS curriculum levels: Year 4 students

Group	Sample si	Below level 2 (%)	CI (%)	Level 2 (%)	CI (%)	Level 3 (%)	CI (%)	Level 4+ (%)	CI (%)
All	1 95	27.5	(23.4 , 32.0)	53.1	(48.3 , 57.9)	18.9	(15.4 , 22.9)	0.5	(0.2 , 1.8)
Gender									
Girls	574	2 .6	(18.3 , 30.0)	53.4	(46.5 , 60.3)	22.2	(17.0 , 28.5)	0.7	(0.2 , 3.2)
Boys	621	31 1	(25.2 , 37.6)	52.8	(46.1 , 59.4)	15.8	(11.5 , 21.3)	0.3	(0.0 , 2.4)
Ethnicity									
Māori	268	0.7	31.2 50.9)	49.6	(39.6 , 59.6)	9.6	(5.1 , 17.3)	0.1	(0.0 , 4.1)
Pacific	154	49.9	(3 .0 63.0)	41.8	(29.5 , 55.1)	8.3	(3.4 , 18.8)	0.0	(0.0 , 6.8)
Asian	143	22.5	(13.1 , 35.9)	54.9	(41.1 , 67.9)	22.3	(12.9 , 35.7)	0.3	(0.0 , 7.8)
NZE	772	19.0	(14 8 , 24 2)	57.0	(51.0 , 62.8)	23.2	(18.6 , 28.7)	0.8	(0.2 , 2.7)
Special education needs									
SEN combined	105	54.8	(38.9 , 6 .8)	41	(27.1 , 57.7)	3.5	(0.7 , 15.2)	0.0	(0.0 , 9.6)
Decile band									
Low decile	291	46.5	(37.0 , 56.2)	46 8	(37.4 , 56.5)	6.7	(3.2 , 13.3)	0.0	(0.0 , 3.7)
Mid decile	438	29.1	(22.5 , 36.8)	4.7	(46.8 , 62.5)	15.8	(10.9 , 22.5)	0.3	(0.0 , 3.1)
High decile	466	14.1	(9.6 , 20.4)	55.5	(47 8 63.0)	29.3	(22.8 , 36.8)	1.0	(0.3 , 4.1)
School type									
Contributing school	746	29.2	(24.0 , 35.1)	51.3	(45 2 , 57 4)	19.0	(14.7 , 24.3)	0.4	(0.1 , 2.3)
Full primary school	413	25.5	(19.0 , 33.2)	55.5	(47 3 , 63.4)	18.3	(12.8 , 25.5)	0.7	(0.1 , 3.8)

Table A1.7 NSS curriculum levels: Year 8 students

Group	S mple size	Below level 2 (%)	CI (%)	Level 2 (%)	CI (%)	Level 3 (%)	CI (%)	Level 4+ (%)	CI (%)
All	1 82	0.8	(0.3 , 2.3)	12.5	(9.6 , 16.0)	49.6	(44.8 , 54.4)	37.1	(32.5 , 41.9)
Gender									
Girls	569	6	(0.1 , 2.9)	8.8	(5.6 , 13.6)	45.6	(38.8 , 52.6)	45.1	(38.2 , 52.1)
Boys	613	1 1	(0.3 , 3.6)	15.9	(11.6 , 21.4)	53.3	(46.6 , 59.9)	29.7	(24.0 , 36.2)
Ethnicity									
Māori	288	3	(0.3 6.0)	21.0	(14.1 , 30.0)	57.9	(48.1 , 67.2)	19.7	(13.1 , 28.6)
Pacific	148	2.4	(.5 , 11.0)	26.4	(16.2 , 39.8)	49.5	(36.3 , 62.8)	21.7	(12.6 , 34.8)
Asian	129	0.9	(0.1 , 9.6)	8.3	(3.2 , 20.1)	43.0	(29.6 , 57.6)	47.7	(33.8 , 62.0)
NZE	725	0.4	(0 1 , 2 2	7.5	(4.8 , 11.5)	49.8	(43.6 , 55.9)	42.4	(36.4 , 48.6)
Special education needs									
SEN combined	48	3.8	(0.5 , 2 5)	34 2	(16.4 , 58.0)	50.9	(29.0 , 72.4)	11.1	(3.0 , 34.0)
Decile band									
Low decile	271	2.1	(0.6 , 7.4)	26 3	(18.4 , 36.0)	53.5	(43.4 , 63.2)	18.2	(11.7 , 27.2)
Mid decile	439	0.5	(0.1 , 3.3)	2.9	(8.5 , 19.2)	53.0	(45.1 , 60.8)	33.6	(26.6 , 41.5)
High decile	472	0.5	(0.1 , 3.2)	4.1	(2 0 8.4)	44.2	(36.8 , 51.9)	51.2	(43.6 , 58.8)
School type									
Full primary school	468	0.9	(0.2 , 3.9)	11.8	(7 7 17)	49.5	(41.9 , 57.1)	37.8	(30.6 , 45.4)
Intermediate school	502	0.8	(0.2 , 3.6)	13.9	(9 5 , 19.8)	49.6	(42.3 , 57.0)	35.6	(28.9 , 43.0)
Composite school (Yr 1-15)	141	2.6	(0.2 , 23.2)	20.3	(5 , 4 5)	54.9	(32.1 , 75.7)	22.3	(8.6 , 46.6)
Secondary school (Yr 7-15)	47	0.2	(0.0 , 7.6)	8.0	(3.1 , 9.1)	7.1	(33.8 , 60.9)	44.7	(31.6 , 58.5)

Table A1.8 Achievement on the NSS Scale: Summary statistics for Year 4 Māori students

Group	Sample size	Mean	Confidence interval for the mean	Standard deviation
All	268	72.5	(69.5 , 75.5)	20.5
Gender				
Girls	137	73.8	(69.5 , 78.1)	21.4
Boys	131	71.0	(67.0 , 75.0)	19.4
Decile band				
Low decile	116	65.4	(61.1 , 69.7)	19.3
Mid decile	102	75.3	(70.4 , 80.2)	20.8
High decile	50	83.2	(77.6 , 88.8)	16 3
School type				
Contributing school	152	71.6	(67.4 , 75.8)	22.1
Full primary school	103	72.3	(68.0 , 76.6)	18.3

Table A1.9 Achievement on the NSS Scale: Summary statistics for Year 8 Māori stu ents

Group	Sample size	Mean	Confidence interval for the mean	Standard deviation
All	288	11 .5	(108.9 , 114.1)	18.5
Gender				
Girls	116	118.2	(114.4 , 122.0)	17.0
Boys	172	106.9	(103.6 , 110.2)	18.1
Decile band				
Low decile	108	106.8	(102.5 , 111.1)	18.8
Mid decile	18	111.6	(107.9 , 115.3)	16.8
High decile	62	119.5	(113.9 , 125.1)	18.4
School type				
Full primary school	95	110.4	(105.3 , 115.5)	20.7
Intermediate school	136	111.1	(107.6 , 114.6)	17.1

Table A1.10 Achievement on the NSS Scale: Differences between subgroup means for Year 4 Māori students

Subgroup 1	Sample size subgroup 1	Subgroup 2	Sample size subgroup 2	Difference in means*	CI for the difference in means	Effect size
Gender						
Girls	137	Boys	131	-2.8	(-6.9 , 1.3)	-0.14
Decile band						
Low decile	116	Mid decile	102	**9.9**	(5.4 , 14.4)	0.49
Low decile	116	High decile	50	**17.8**	(13.0 , 22.6)	0.96
Mid decile	102	High decile	50	**7.9**	(2.8 , 13.0)	0.4
School type						
Contributing	152	Full primary	103	0.7	(-3.5 , 4.9)	0.03

* Differences in means in bold font are statistically significant

Table A1.11 Achievement on the NSS Scale: Differences between subgroup means for Yea 8 Māo students

Subgroup 1	Sample size subgroup 1	Subgroup 2	Sample size subgroup 2	Difference in eans*	C for e di ference in means	Effect size
Gender						
Girls	116	Boys	172	**-1 3**	(-14.8 , -7.8)	-0.64
Decile band						
Low decile	108	Mid decile	118	**4 8**	(0.9 , 8.7)	0.27
Low decile	108	High decile	62	**12.7**	(7.8 , 17.6)	0.68
Mid decile	118	High decile	6	**7.9**	(3.3 , 12.5)	0.45
School type						
Full primary school	95	Inte mediate	136	0.7	(-3.6 , 5.0)	0.04

* Differences in means in bold font are statistically significan

Table A1.12 Achievement on the NSS S ale: Differences between means for Year 4 and Year 8 Māori by subgroup

Group	Year 4 sample size	Year 8 sample size	Year 8–Year 4 difference in means*	CI for difference in means	Effect size
All	268	288	**39.0**	(36.3 , 41.7)	2.00
Gender					
Girls	137	116	**44.4**	(40.2 , 48.6)	2.28
Boys	131	172	**35.9**	(32.6 , 39.2)	1.92
Decile band					
Low deci	116	108	**41.4**	(37.1 , 45.7)	2.17
M d decile	102	118	**36.3**	(32.2 , 40.4)	1.94
High decile	50	62	**36.3**	(31.1 , 41.5)	2.07

* Dif rences in means in bold font are statistically significant

Table A1.13 NSS curriculum levels: Year 4 Māori students

Group	Sample size	Below level 2 (%)	CI (%)	Level 2 (%)	CI (%)	Level 3 (%)	CI (%)	Level 4+ (%)	CI (%)
All	268	40.7	(31.2 , 50.9)	49.6	(39.6 , 59.6)	9.6	(5.1 , 17.3)	0.1	(0.0 , 4.1)
Gender									
Girls	137	38.1	(25.7 , 52.4)	49.9	(36.2 , 63.6)	11.9	(5.4 , 24.1)	0.1	(0.0 , 7.8)
Boys	131	43.4	(30.0 , 57.8)	49.4	(35.4 , 63.4)	7.2	(2.6 , 18.6)	0.0	(0.0 , 7.9)
Decile band									
Low decile	116	55.0	(39 8 , 69.3)	41.7	(27.8 , 57.1)	3.3	(0.7 , 14.0)	0.0	(0.0 , 8.8)
Mid decile	102	36.7	22.9 , 53.3)	50.0	(34.3 , 65.7)	13.0	(5.5 , 27.9)	0.2	(0.0 , 10.2)
High decile	50	15.6	(5 2 , 38.6)	67.1	(43.7 , 84.3)	17.2	(6.0 , 40.4)	0.0	(0.0 , 18.3)
School type									
Contributing school	152	43.9	31.4 , 57 3)	45.0	(32.3 , 58.3)	11.0	(5.1 , 22.3)	0.1	(0.0 , 7.1)
Full primary school	103	39.2	(25.0 55.)	53 9	(37.9 , 69.1)	6.9	(2.1 , 20.1)	0.0	(0.0 , 9.8)

Table A1.14 NSS curriculum levels: Year 8 Māori students

Group	Sample size	Below level 2 (%)	CI (%)	L vel 2 (%)	CI (%)	Level 3 (%)	CI (%)	Level 4+ (%)	CI (%)
All	288	1.3	(0.3 , 6.0)	21.0	(14.1 , 30.0)	57.9	(48.1 , 67.2)	19.7	(13.1 , 28.6)
Gender									
Girls	116	0.2	(0.0 , 9.2)	11.3	(7 , 24.7)	58.0	(42.6 , 71.9)	30.5	(18.4 , 45.9)
Boys	172	2.1	(0.4 , 9.6)	27.5	(.8 , 40 0)	57.9	(45.2 , 69.6)	12.5	(6.3 , 23.2)
Decile band									
Low decile	108	2.1	(0.3 , 12.8)	30.7	(18.3 , 46 8)	53.1	(39.9 , 65.9)	14.1	(7.2 , 25.9)
Mid decile	118	0.6	(0.0 , 9.7)	19.5	(10.2 , 34.1)	2 5	(49.7 , 73.8)	17.4	(9.8 , 29.1)
High decile	62	1.5	(0.1 , 17.8)	6.9	(1.6 , 25.3)	57.6	(37.1 , 75.8)	33.9	(17.7 , 55.0)
School type									
Full primary school	95	3.0	(0.5 , 15.3)	22.4	(11.5 , 39.2)	54.4	37.7 , 70.1)	20.2	(9.9 , 36.7)
Intermediate school	136	0.5	(0.0 , 8.5)	20.6	(11.5 , 34.2)	62.1	(47 8 74.6)	16.7	(8.7 , 29.8)

Table A1.15 Achievement on the NSS Scale: Summary statistics for Year 4 Pacific students

Group	Sample size	Mean	Confidence interval for the mean	Standard deviation
All	154	69.3	(65.4 , 73.2)	20.3
Gender				
Girls	74	72.8	(67.5 , 78.1)	19.1
Boys	80	66.0	(60.4 , 71.6)	20.9
Decile band				
Low decile	109	67.5	(63.1 , 71.9)	19.4
School type				
Contributing school	123	69.0	(64.5 , 73.5)	21.2

Table A1.16 Achievement on the NSS Scale: Summary statistics for Year 8 Pacific students

Group	Sample size	Mean	Conf denc inter al fo the me n	Standard deviation
All	148	109.8	(10 8 , 113.8)	20.6
Gender				
Girls	64	1 2	(104.5 , 117.9)	22.2
Boys	84	10 7	(103.6 , 113.8)	19.4
Decile band				
Low decile	94	04.2	(99.4 , 109.0)	19.5
School type				
Full primary school	6	113.3	(107.1 , 119.5)	20.5
Intermediate school	76	105.7	(100.2 , 111.2)	20.0

Table A1.17 Achievement on the NSS Scale: Differences between subgroup means for Year 4 Pacific students

Subgroup 1	Sample size subgroup 1	Subgroup 2	Sample size subgroup 2	Difference in means*	CI for the difference in means	Effect size
Gender						
Girls	74	Boys	80	**-6.8**	(-12.1 , -1.5)	-0.34

* Differences in means in bold font are statistically significant

Table A1.18 Achievement on the NSS Scale: Differences between subgroup means for Year 8 Pacific students

Subgroup 1	Sample size subgroup 1	Subgroup 2	Sample size subgroup 2	Difference in means*	CI for the difference in means	Effect s ze
Gender						
Girls	64	Boys	84	-2.5	(-8.3 , 3.3)	0.12
School type						
Full primary school	64	Intermediate school	76	**-7.6**	(-13 3 , -1.9	-0.38

* Differences in means in bold font are statistically significant

Table A1.19 Achievement on the NSS Scale: Differences between means for ar 4 nd Year 8 Pacific students by subgroup

Group	Year 4 sample size	Year 8 sample size	Year 8–Year 4 dif rence in means	CI for difference in means	Effect size
All	154	148	**40.5**	(36.6 , 44.4)	1.98
Gender					
Girls	74	64	**38.4**	(32.3 , 44.5)	1.86
Boys	80	4	**42.7**	(37.5 , 47.9)	2.12
Decile band					
Low decile	109	94	**36.7**	(32.0 , 41.4)	1.89

* Differences in means in bold font are statistica y sign i

Table A1.20 NSS curriculum levels: Year 4 Pacific students

Group	Sample size	Below level 2 (%)	CI (%)	Level 2 (%)	CI (%)	Level 3 (%)	CI (%)	Level 4+ (%)	CI (%)
All	154	49.9	(37.0 , 63.0)	41.8	(29.5 , 55.1)	8.3	(3.4 , 18.8)	0.0	(0.0 , 6.8)
Gender									
Girls	74	43.4	(26.3 , 62.2)	46.4	(28.8 , 64.9)	10.2	(3.3 , 27.5)	0.0	(0.0 , 13.2)
Boys	80	56.0	(37.9 , 72.7)	37.5	(22.0 , 56.0)	6.5	(1.7 , 22.0)	0.0	(0.0 , 12.3)
Decile band									
Low decile	109	53.2	(37 7 , 68.1)	41.3	(27.1 , 57.2)	5.5	(1.5 , 17.7)	0.0	(0.0 , 9.3)
School type									
Contributing school	123	50.5	(36 0 , 64.9)	40.6	(27.2 , 55.6)	8.9	(3.4 , 21.2)	0.0	(0.0 , 8.4)

Table A1.21 NSS curriculum levels: Year 8 Pacific students

Group	Sample size	Below level 2 (%)	CI %)	Lev l 2 (%)	CI (%)	Level 3 (%)	CI (%)	Level 4+ (%)	CI (%)
All	148	2.4	(0.5 , 11.0)	26.4	(16.2 , 39.8)	49.5	(36.3 , 62.8)	21.7	(12.6 , 34.8)
Gender									
Girls	64	2.7	(0.3 , 19.1)	25.7	(12 1 , 46.6)	44.9	(26.5 , 64.8)	26.7	(12.8 , 47.6)
Boys	84	2.2	(0.3 , 15.3)	26.9	(14.2 , 45.0)	53.1	(35.6 , 69.8)	17.8	(8.0 , 35.3)
Decile band									
Low decile	94	3.6	(0.7 , 16.3)	34.3	(2 .4 , 51.5)	49.3	(33.1 , 65.7)	12.8	(5.2 , 28.4)
School type									
Full primary school	64	0.9	(0.0 , 16.4)	23.0	(10.3 43.7	8.3	(29.3 , 67.8)	27.8	(13.5 , 48.6)
Intermediate school	76	3.9	(0.7 , 18.9)	30.2	(16.1 , 49 4)	52.1	(33.9 , 69.7)	13.8	(5.3 , 31.7)

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- the teachers who administered the assessments to the students
- the teachers and senior initial teacher education students who undertook the marking
- the Ministry of Education Research Team and Steering Committee.

Appendix 1:
Sample Characteristics for 2018

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Samples for 2018

A two-stage sampling design was used to select nationally representative samples of students at Year 4 and at Year 8. The first stage involved sampling schools; the second stage involved sampling students within schools.

A stratified random sampling approach was taken to select 100 schools at Year 4 and 100 schools at Year 8. A maximum of 25 students were randomly selected from each school to form national samples at Year 4 and Year 8.

The Ministry of Education July 2017 school returns for Year 3 and Year 7 were used to inform the selection of Year 4 and Year 8 schools in 2018.

1. Sampling of schools

Sampling algorithm

From the complete list of NZ schools select two datasets – one for Year 3 students and one for Year 7 students.

For the Year 3 sample:

- Exclude:
  - schools which have fewer than eight Year 3 students
  - private schools
  - special schools
  - Correspondence School
  - Kura Kaupapa Māori
  - trial schools
  - Chatham Island schools.
- Stratify the sampling frame by region and uintile[1].
- Within each region-by-quintile s ratum, order the schools by Year 3 roll size[2].
- Arrange the strata alternately in inc easing and decreasing order of roll size[3].
- Select a random starting p int.
- From the random tartin point, cumulate the Year 3 roll.
- Because 100 schools re required in the sample, the sampling interval is calculated as:

$$\frac{\text{Total umber f Year 3 students}}{00}$$

- A sign ach chool to a 'selection group' using this calculation:

$$Selection\ group\ =\ ceiling\left(\frac{cumulative\ roll}{sampling\ interval}\right)$$

- Select the first school in each selection group to form the final sample.

Follow the same process for the Year 7 sample.

If a school is selected in both the Year 3 and Year 7 samples, randomly assign it to one of the two samples. Locate the school in the unassigned sample and select a replacement school (next on list). Repeat the process for each school selected in both samples.

[1] Decile 1 and 2 comprises Quintile 1; Decile 3 and 4 comprises Quintile 2; Decile 5 and 6 comprises Quintile 3; Decile 7 and 8 comprises Quintile 4; and Decile 9 and 10 comprises Quintile 5.

[2] Roll size refers to the year level in question e.g. roll size for Year 3 students.

[3] This is done so that when replacements are made across stratum boundaries the replacement school is of a similar size to the one it is replacing.

Substitution procedure

The sampling frames constituted 1,497 schools for Year 3 and 961 schools for Year 7 after exclusions had been applied. No schools were listed in both samples.

Selected schools were invited to participate in 2018. Therefore 'Year 3 schools' became 'Year 4 schools' and similarly 'Year 7 schools' became 'Year 8 schools'. Those that declined to participate were substituted using the following procedure.

- From the school sampling frame, select the school one row below the school withdrawn.
- If this school is not available, re-select by going to one row above the school withdrawn.
- If this school is not available, select the school two rows below the school withdrawn. Continue n this sequence until a substitute is found.

In total, 43 schools at Year 4 and 58 schools at Year 8 declined to participate, before a sample of 100 schools at each of Years 4 and 8 was achieved. Of the 43 Year 4 schools, 29 were from the original sample and 14 were replacement schools who also withdrew. Of the 58 Year 8 schools, 39 wer fro the riginal sample and 19 were replacement schools who also withdrew.

2. Sampling of students

Four nested student samples were required for the assessment programme:

- A group-administered task (GAT) sample for mathematics tha include up to 25 students per school who completed the assessment in mathemati s and questi nna res in mathematics and social studies.
- A subset of up to 12 students per school formed the g oup-administered task (GAT) sample for social studies. These students completed the social studie computer-based assessments.
- A subset of up to eight students formed the sample that participated in the in-depth (InD) assessment in social studies.
- A subset of up to six students formed the ample that participated in the InD assessment in mathematics.

The procedure for selecting students for he samples was as follows.

- Participating schools we asked to provide a list of all students in their school at the relevant year level (Year 4 or Year 8) in 2018, identifying any students who should be excluded for logistical reasons, or because the ex erience would be inappropriate (e.g. high special needs (ORS), very limited Engli h language (ESOL), Māori Immersion Level 1, would be absent during the visit, had left the scho l, other health or behavioural issues).
- For each s hool, tudents identified for exclusion from the sampling frame were removed from the list, nd co puter-generated random number between 1 and 1 million was assigned to each of th rem ining students. They were then ranked in order of their random number from lowest to highe t.
- The first 25 students in the ordered list were identified as belonging to the GAT mathematics sample. The first 12 students also belonged to the GAT social studies sample, the first 8 students to the sample that participated in the in-depth assessment for social studies, and the first 6 students to the sample that participated in the in-depth assessment for mathematics.
- The names of selected students were returned to schools for approval. Principals or contact people were given a second opportunity to identify students for whom the NMSSA assessment would be inappropriate. Any students identified for withdrawal were replaced with students ranked 26 onwards from the ordered list. The resultant sample was confirmed and letters of consent were sent to the parents of selected students on our behalf via the schools.
- The children of parents who declined to have their child participate were withdrawn from the sample and were replaced in the same way as above (if there were sufficient eligible students).

However, no replacements were added within two weeks of the date of the school visit, as there was insufficient time to seek parental permission.

- On-site replacements of students by teacher assessors (TAs) were made if any of the students 1–8 (the InD sample) were absent or withdrawn on the first day, prior to the start of assessments. They were replaced by students ranked 9–25, on a best-match basis (e.g. using our gender/ethnicity replacement priorities).
- If students were absent or withdrawn after the start of the assessment programme, no replacements were made.

The following sections describe the achieved GAT and InD samples of students at Year 4 and Year 8 and contrast their demographic characteristics with those of their respective national populations (th ough comparison with the sample frame of eligible schools). This allows us to assess the nati nal representativeness of the samples in relation to those characteristics.

Achieved samples at Year 4

Across the 100 schools participating at Year 4, principals identified 325 students for whom the experience would be unsuitable. These students were not considered for inclusion in the scho l sample

The initial sample (the first 25 students in each school's ordered list) consi ted of 2,390 andomly selected students. Principals or parents withdrew 193 students after the sample was drawn. Substitute (replacement) students numbered 155. A further 194 students were withdrawn without s ffici nt time for replacement, were absent or did not respond for other reasons during th asse sment eriod. The achieved GAT mathematics sample included 2,158 students.

Table A1.1 The selection of Year 4 students for the GAT and InD sa es from 100 schools

	Group administered task		In-depth tasks	
Learning area	**Maths**	**Social Studies**	**Maths**	**Social Studies**
Initial sample numbers	**239**	**1198**	**600**	**800**
Students withdrawn by parents or principals after sampling	-1 3	-4	-	-1
Substitute students used (replacements for above)	155	-	-	-
Late withdrawals made prior t commencement of assessment programme	-35	-	-	-
Absences, non-re ponses uring assessment p iod	-159	-	-	-
Achieved sample n mbers	**2158**	**1194**	**600**	**799**

Table A1.2 contrasts the characteristics of the samples with the sample frame across a number of key demographic variables.

Table A1.2 The composition of the Year 4 samples in comparison with the sample frame by gender, ethnicity, school quintile, school type and education region

	Population *N=61,844* (%)	Samples			
		GAT		InD	
		Maths	Social Studies	Maths	Social Studies
Gender					
Boys	**51**	51	52	50	51
Girls	**49**	49	48	50	49
Ethnicity					
European	**52**	55	56	56	57
Māori	**21**	19	19	20	20
Pacific	**12**	12	11	1	11
Asian	**12**	11	10	9	10
Other	**3**	4	3	3	3
School quintile					
1	**17**	15	16	16	16
2	**17**	18	19	19	19
3	**17**	16	16	16	16
4	**22**	20	21	21	21
5	**28**	30	28	28	28
School type					
Contributing (Years 1-6)	**61**	64	62	62	62
Full Primary (Years 1-8)	**37**	33	35	35	35
Composite (Years 1-15)	**3**	3	3	3	3
MOE region					
Auckland	**35**	36	34	34	34
Bay of Plen y/W riki	**8**	8	8	8	8
Canterbury	**12**	11	11	11	11
H wkes Ba /Tairāwhiti	**5**	5	5	5	5
Nel n/Ma lborough/West Coast	**4**	4	4	4	4
Otago/Southland	**6**	7	7	7	7
Northland/Tai Tokerau	**4**	4	4	4	4
Taranaki/Whanganui/Manawatu	**7**	6	6	6	6
Waikato	**9**	8	9	9	9
Wellington	**12**	12	12	12	12

Note: Ministry of Education July 2018 school returns for Year 4

Achieved samples at Year 8

Principals in schools selected at Year 8 identified 482 students for whom the NMSSA assessment experience would be unsuitable. The initial sample at Year 8 consisted of 2,335 randomly selected students. Principals or parents withdrew 195 students after the sample was drawn. Substitute (replacement) students numbered 157. A further 214 students were withdrawn late, were absent or did not respond for other reasons during the assessment period. The achieved GAT mathematics sample was 2,083 students at Year 8.

Table A1.3 The selection of Year 8 students for the GAT and InD samples from 100 schools

	Group administered tasks		In-depth tasks	
Learning area	**Maths**	**Social Studies**	**Maths**	**Social Studi s**
Initial sample numbers	**2335**	**1191**	**600**	**799**
Students withdrawn by parents or principal after sampling	-195	-4	-2	
Substitute students used (replacements for above)	157	-	-	
Late withdrawals	-28	-	-	-
Absences/non-responses during assessment period	-186	-	-	-
Achieved sample	**2083**	**187**	**598**	**793**

Table A1.4 contrasts the characteristics of the samples with the sample frame across a number of key demographic variables.

Table A1.4 The composition of the Year 8 samples in comparison with the sample frame by gender, ethnicity, school quintile, school type and education region

	Population N=55,003 (%)	Samples			
		GAT		InD	
		Maths	Social Studies	Maths	Social Studies
Gender					
Boys	51	52	52	52	52
Girls	49	48	48	48	8
Ethnicity					
European	54	53	53	54	54
Māori	21	19	21	21	21
Pacific	11	11	11	11	11
Asian	11	11	9		9
Other	3	5	6	6	5
School quintile					
1	14	12	14	14	14
2	16	16		16	16
3	22	22	22	22	22
4	24	26	25	25	25
5	24	2	23	23	23
School type					
Full primary (Year 1-8)	31	38	40	40	40
Intermediate	48	44	42	42	42
Secondary (Year 7-15)	16	14	13	13	13
Composite (Year 1-15)	5	5	5	5	5
MOE region					
Auckland	33	36	35	35	35
Bay of Plenty/Waia ki	8	8	7	7	7
Canterbury	12	12	12	12	12
Hawkes Bay/T irāw iti	5	5	5	5	5
N son/Ma lborough/West Coast	4	4	4	4	4
Ota o/Southland	7	7	7	7	7
Northland/Tai Tokerau	4	3	4	4	4
Ta anaki/Whanganui/Manawatu	7	7	7	7	7
Waikato	9	8	8	8	8
Wellington	11	11	12	11	11

Note: Ministry of Education July 2018 school returns for Year 8

At both year levels the student samples closely matched the characteristics of the population (as represented by the sample frame) in relation to the identified demographic variables. We have confidence in their national representativeness.

Appendix 2:
Methodology for the 2018 NMSSA Programme

Contents:

Tables:

This appendix outlines the methodology for the 2018 social studies and mathematics and statistics (hereafter mathematics) studies undertaken by the National Monitoring Study of Student Achievement (NMSSA).

1. The 2018 social studies assessment programme

The 2018 social studies assessment programme built upon the assessment framework and associated assessment programme developed for the 2014 social studies study. In 2018, we used a variety of assessment approaches to assess the Nature of Social Studies (NSS). The first approach involved a group-administered task (GAT) delivered via laptop to 1200 students at Year 4 and 1200 students at Year 8. Th second approach included a set of in-depth group and individual tasks undertaken by a subset o 800 students. The group tasks encouraged group discussion and participation. The third approach con iste of one-to-one interview tasks conducted with a subset of 600 students at each year level. In-depth asses ent, including interviews, provided an opportunity to explore students' knowledge and understanding of social studies without the limitations inherent in requiring students to communicate respons s in written form. The NSS consisted of 17 tasks, six of which were link tasks from the 2014 study. Table A2.1 ummarises the key differences between the assessment programmes in 2014 and 2018. See App ndix 7 for the 2018 assessment framework.

Table A2.1 The key features of the 2014 and 2018 social studies assessment prog mes

	2014	2018
Assessment approaches	The Nature of Social Studies (NSS) assessment was made up of in-depth tasks* using interviews and individual or group activities. The tasks covered the strands of Conceptual Understanding, Active Participation in ociety, and Values and Perspectives. Responses from the NSS task were ed o create an IRT measurement sca All assessments were vi eoe	T e NSS scale was made up a diverse range of assess t approaches. The assessment combined a GAT administered on laptops and in-depth tasks (interviews, and group and individual activities). NSS was expanded to include an additional strand: Information gathering and analysis. All in-depth tasks were videoed.
Number of students	Eight students per sch ol artic ated in the in-depth tasks, giving tota of 800 students at Year 4 nd 800 stude ts at Year 8.	Up to 12 students per school participated in the GAT. Eight students per school participated in the group and individual activities, and six students per school participated in interviews.

NB *A task is an assessment c ntext. E ch task has several questions.

Development and trialling of social studies tasks

The NMSSA team eview d all 2014 social studies tasks for possible inclusion in the 2018 assessment programme Som tasks were retained in their original format to be used as link tasks, necessary for making comparison between 2014 and 2018. Tasks were based on the focus of the social studies learning area, which is defined as being, 'about how societies work and how people can participate as critical, acti e, informed, and responsible citizens' (NZC[4], p. 30).

New and modified tasks were piloted in local schools before being used in a NMSSA trial in March 2018 inv lving schools in Auckland and Otago/Southland. The student responses from the pilots and the trial were used to refine the tasks and support the development of appropriate scoring guides. An Item Response Theory (IRT) model[5] was applied to the trial data to help refine the tasks, inform the selection of tasks for the main study and explore the development of the reporting scale: Nature of Social Studies (NSS) that paralleled and extended the 2014 scale.

[4] Ministry of Education (2007). *The New Zealand Curriculum.* Wellington: Learning Media Limited.

[5] IRT is an approach to constructing and scoring assessments and surveys that measure mental competencies and attitudes. IRT seeks to establish a mathematical model to describe the relationship between people (in terms of their levels of ability or the strengths of their attitude) and the probability of observing a correct answer or a particular level of response to individual questions. IRT approaches provide flexible techniques for linking assessments made up of different questions to a common reporting scale. The common scale allows the performance of students to be compared regardless of which form of the assessment they were administered.

Administration of the assessment tasks

Eleven teacher assessors were trained in the administration of tasks during a five-day training programme prior to the main study. Teacher assessors were carefully monitored and received feedback to ensure consistency of administration. Student responses were captured on video and paper and stored electronically for marking.

2. 2018 mathematics and statistics assessment programme

The 2018 mathematics assessment programme built upon the mathematics programme used in 2013. The programme retained many of the tasks used in 2013 and included a range of new tasks. Table A2.2 compares the assessment programmes for 2013 and 2018. The biggest change was the construction of rather than two scales.

Table A2.2 The key features of the 2013 and 2018 mathematics assessment programmes

	2013	2018
Assessment approaches	Two separate assessments: • a 45-minute, group-administered task (GAT). This was a paper-and-pencil assessment involving selected response and short answer questions called the Knowledge and Application of Mathematics Ideas (KAMSI) assessment • a selection of individual one-to-one interview tasks and individual and group performance activities called the Mathematical and Statistical Proficienc es (MSP) assessment. A separate scale was constructed for each assessment: the KAMSI scale and the MSP scale.	One assessment made up of tw pa • a paper-and-pen 45-m nute group-administered ask (GAT) component involv g sele ted response and short answer q estio s • a selection o 'in-depth' tasks involving st dent tervi ws, independent 'station', a d g up a tivities. R pons from both components were used to c nstruct one scale: the Mathematics and Statistics (MS) scale.
Number of students	Up to 25 students per school participated n the paper-and-pencil assessment. Eight of hes students per school participated the in-de th tasks.	Up to 25 students per school participated in the paper-and-pencil assessment. Up to six of these students per school participated in the in-depth tasks.

Development of the group-administered part of the MS assessment

The group-administered (GAT) part o the MS assessment was based on the questions developed for the group-administered asse ment used in the 2013 study. Assessment development staff within the NMSSA project reviewed the existing items in order to identify areas where new items could be added to support the assessment framew rk and broaden the pool of questions. They then wrote a collection of new questions to cover these areas. All new questions were carefully reviewed before being piloted in a range of schools in the Wellington a a. The results from the piloting were used to select and fine-tune questions for a larger national trial.

The nationa item trial was held in March of 2018. The trial involved about 400 students at each of Year 4 and Year 8, and enabled the development team to refine the new items as needed and then select a final bank of questions for use in the main study.

A to al of 14 GAT forms were constructed for the 2018 study, based on the final pool of questions (eight forms at Year 8 and six at Year 4). Each form was linked to the other forms using common questions.

Development of the in-depth tasks for mathematics

A selection of in-depth tasks was also developed as part of the MS assessment. These were designed to be more open-ended than the GAT and to stimulate extended responses from students.

Development began with a review of the in-depth tasks used in 2013. Some of these tasks were adapted for use in 2018. A selection of new tasks were also developed. Most of the tasks were designed to be administered as part of a one-to-one interview with a teacher assessor, while some were designed to be completed independently as part of a group of 'stations' activities. There was also one task designed to be

completed by a pair of students in each school, that explored their ability to problem-solve co-operatively. Many of the in-depth tasks required students to use equipment or consider a rich stimulus.

An initial group of in-depth tasks were piloted in local schools in Wellington and Auckland in late 2017 and early 2018. Some of these were then used in a larger item trial held in March 2018 that involved a selection of schools in Auckland and Otago/Southland. Data from the pilots and trials were used to refine the tasks and their associated scoring rubrics. As a result of the development process, eleven in-depth tasks were selected for use in the main 2018 study.

Use of the MS assessment in the 2018 NMSSA study

Teacher assessors were instructed on how to administer the MS assessment during a five-day training session prior to the main study.

The group-administered part of the MS assessment was administered to up to 25 students in each school Up to six students in each school completed the in-depth tasks.

Linking Year 4 and Year 8 results in mathematics

To enable achievement to be linked across Year 4 and Year 8, four additional GAT forms were constructed using a mix of questions from both year levels. These were administered to a sample f a ut 800 Year 6 students from schools across the country. The Year 6 schools used wer addi ional schools not already involved in the NMSSA study.

3. Marking social studies and mathematics

Teacher markers, some of whom had been teacher assess rs, and hird-year University of Otago College of Education students were employed to mark the tasks. Al markers were trained, and quality assurance procedures were used to ensure consistency of marking. The m rking schedules were refined as necessary to ensure they reflected the range of responses found in the main study. Students' scores were entered directly by the markers into the electronic database.

Inter-rater reliability was calculated using Flei s Kappa for 203 items in social studies and mathematics. Inter-rater reliability was 'perfect' (greater th n 0.81) for 59 percent of the questions, 'substantial' (between 0.61 and 0.80) for 17 percent of the questions, and 'moderate' (between 0.41and 0.60) for 24 percent of the questions[6] (Cicchetti, 1994)[7]

4. Creating the chievement scales for social studies and mathematics

The Rasch IRT mod l was pplied to student responses from the items in the NSS and MS assessments. This approach incl ded an lysing the items used in the assessments for any differential item functioning with respect to year l vel, gender and ethnicity.

The IRT ap roach a lowed a set of plausible values to be generated for each student involved in the study. Plausibl valu s account for the imprecision associated with scores in an assessment, which can produce bias d estimates of how much achievement varies across a population. Each set of plausible values epre ents the range of achievement levels a student might reasonably be expected to attain given their r sponses to the assessment items. Plausible values provide more accurate estimates of population and subgroup statistics, especially when the number of items answered by each student is relatively small.

6 Six items were re-marked to improve their inter-marker reliability.

7 Cicchetti, D. V. (1994). Guidelines, criteria, and rules of thumb for evaluating normed and standardized assessment instruments in psychology. *Psychological Assessment*, *6*(4), 284.

Standardising the scales

For ease of understanding, each scale was standardised so that:

- the mean of Year 4 and Year 8 students combined was equal to 100 scale score units
- the average standard deviation for the two year-levels was equal to 20 scale score units.

Achievement on the scales ranged from about 20 to 180 units.

The scales locate both student achievement and relative task difficulty on the same measurement continuums using scale scores.

Scale descriptions

The scales for NSS and MS were described to indicate the range of knowledge and skills assessed.

To create the scale descriptions, the scoring categories for each item (e.g. 0, 1 or 2) in the NSS and MS assessments were located on the respective scales. This meant identifying where the students who sco d in each category were most likely to have achieved overall on the scale. Once this had been done for all items, the NMSSA team identified the competencies exhibited as the scale locations associated with the different scoring categories increased, and students' responses became more sophisticated. The result was a multi-part description for each scale, providing a broad indication of what students typically know and can do when achieving at different places on the scale.

The descriptions were provided to give readers of NMSSA reports a strong sen e of how social studies and mathematics were assessed. The scale descriptors were not written to neces arily line up' with curriculum levels or achievement objectives. They were a direct reflection f w a was assessed and how relatively hard or easy students found the content of the assessment

5. Linking results from cycle 1 to cycle 2

In order to compare results from cycle 1 with thos from 2018, separate scale-linking exercises were carried out for social studies and mathemati s. Th exercises involved comparing the scale locations of the common questions used in the assessments at th differen points of time. As part of the exercises, the cycle 1 scales were reconstructed using the same plausible va ues approach that was used in 2018 (plausible values were not used when social studi s and mathematics were assessed in cycle 1). The linking exercises indicated that simple transformations cou d be used to link the scales. These transformations were applied, allowing results from both cycl s to be compared. Further information about the linking processes can be found in Appendix 5 (s cial s udies) an Appendix 6 (mathematics).

6. Reporting achievement against curriculum levels

For mathematic a c rriculum alignment exercise in 2013 was used to determine achievement expectations (cut scores) on h 2013 mathematics scale associated with achievement at different curriculum levels. Linking the 2013 s ale to the 2018 MS scale allowed these cut scores to be located on the MS scale. A similar cur iculum alignment for social studies was carried out in 2014. This, along with scale linking for s ci l studie allowed achievement on the 2018 NSS scale to be reported against curriculum levels.

7. Development of questionnaires for examining contextual information

In order to gain a better understanding of student achievement in New Zealand, NMSSA collects contextual information through questionnaires to students, teachers and principals. A conceptual framework for describing the contextual information to be collected by NMSSA during cycle 2 sought to:

- build (and improve) on the contextual information collected in the first cycle
- learn from the literature about important factors that influence achievement and consider them for inclusion in NMSSA
- address the thematic contextual questions set out in the respective assessment plans.[8]

One new development in cycle 2 was the creation of measurement scales to report on different aspects of the contextual information.

For the student questionnaire, items were developed to construct the following scales:

- Attitude to Social Studies
- Attitude to Mathematics
- Confidence in Social Studies
- Confidence in Mathematics.

For the teacher questionnaire, items were developed to construct the following scales:

- Attitude to Teaching Social Studies
- Attitude to Teaching Mathematics
- Confidence in Teaching Social Studies
- Confidence in Teaching Mathematics.

The scales were constructed using the Rasch model. This approach included analysing the items used in the questionnaires for any differential item functioning with respect to year level, gender and ethnicity. Unlike the achievement measures, plausible values were not generated for the contextual scales. Each contextual scale was standardised in the same way as the achievement scales.

To aid interpretation of the contextual scales they were divided into separate score ranges to provide different reporting categories. For instance, the Attitude to Social Studies scale was broken down into three score ranges. The 'very positive' part of the scale was associated with students mainly using the 'totally agree' category to respond to each of the questionnaire statements related to attitude, the 'positive' section of the scale was associated with students mainly using either 'agree a lot' or 'agree a little', and the 'not positive' part of the scale was associated with students mainly using 'do not agree at all'.

8. Administration of the questionnaires

Students who participated in the mathematics GAT and the social studies GAT were all expected to respond to the associated student questionnaire items. Up to three teachers from each school were invited to complete the teacher questionnaire. These were classroom teachers, social studies specialist teachers and mathematics specialist teachers. The principal or a designated school leader (if principal unavailable) from each school completed the principal questionnaire.

[8] Gilmore, A. (2016). Towards a NMSSA conceptual framework. NMSSA Working Paper.

Appendix 3:
NMSSA Sample Weights 2018

Contents:

Tables:

The methodology for calculating sample weights on an annual basis is detailed in *NMSSA Approach to Sample Weighting,* available online at https://nmssa.otago.ac.nz/reports/Sample_Weighting_NMSSA.pdf.

Each year we set out a brief summary of the effect of applying sample weights in the analysis of the current year's data, and make a recommendation as to whether weights should be used.

Tables of estimated[9] means and standard errors calculated with and without sample weights follow. In 2018, NMSSA measured achievement in social studies and mathematics. Information about the respective samples can be found in Appendix 1.

Tables 1 and 2 report the NMSSA estimated means and standard errors (in scale score units) for the Year 4 and Year 8 social studies samples, respectively; Tables 3 and 4 report these for the mathematics samples.

Summary

All weighted estimates were well within one standard error of the estimated unweighted mean.

The recommendation was to proceed with the 2018 analyses without using sample weights.

[9] All estimates of means and standard errors are calculated using the full sample size rather than the *effective sample size* defined by the design effect calculations. See Appendix 4.

Social Studies

Table A3.1 NMSSA social studies achievement Year 4: Comparison of estimates using unweighted and weighted data

	Year 4					
	Using unweighted data		Using weighted data			
	Mean	SE	Mean	SE	Difference	N
All	80.3	0.6	80.2	0.6	0.1	1195
Girls	82.7	0.8	82.6	0.8	0.1	574
Boys	78.0	0.8	78.0	0.8	0.0	62
NZE	84.7	0.7	84.8	0.7	-0.1	772
NZE girls	87.0	0.9	87.2	0.9	-0.2	372
NZE boys	82.5	0.9	82.6	0.9	-0.1	400
Māori	72.5	1.3	72.3	1.3	0.2	268
Māori girls	73.8	1.8	73.6	1.8	0 2	137
Māori boys	71.0	1.7	70.9	1.7	0.1	131
Pacific	69.3	1.6	69.2	1	0.1	154
Pacific girls	72.8	2.2	72 9	2.2	-0.1	74
Pacific boys	66.0	2.3	65.7	2.3	0.3	80
Asian	83.3	1.6	83	1.6	0.0	143
Asian girls	86.5	2.3	86.5	2.3	0.0	71
Asian boys	80.1	2.1	80.1	2.1	0.0	72
Quintile 1	67.0	1 4	66.9	1.4	0.1	195
Quintile 2	74.8	1 2	74.7	1.2	0.1	224
Quintile 3	78.2	1.5	78.2	1.5	0.0	192
Quintile 4	85.5	.2	85.5	1.2	0.0	249
Quintile 5	88 9	1.0	88.9	1.0	0.0	335

Table A3.2 NMSSA social studies achievement Year 8: Comparison of estimates using unweighted and weighted data

Year 8						
	Using unweighted data		Using weighted data			
	Mean	SE	Mean	SE	Difference	N
All	119.7	0.6	119.9	0.6	-0.2	1182
Girls	123.7	0.8	123.7	0.8	0.0	569
Boys	116.1	0.8	116.1	0.8	0.0	6 3
NZE	123.1	0.7	123.2	0.7	-0.1	72
NZE girls	126.4	0.9	126.4	0.9	0.0	36
NZE boys	119.9	0.9	119.9	0.9	0.0	364
Māori	111.5	1.1	111.6	1.1	-0	288
Māori girls	118.2	1.6	118.2	1.6	0.0	116
Māori boys	106.9	1.4	106.9	1.4	0.0	172
Pacific	109.8	1.7	109.8	1 7	0.0	148
Pacific girls	111.2	2.8	111 2	2.8	0.0	64
Pacific boys	108.7	2.1	108.7	2.1	0.0	84
Asian	124.1	1.7	2 .1	1.7	0.0	129
Asian girls	126.7	2.3	126.	2.3	0.0	74
Asian boys	120.6	2.5	120.6	2.5	0.0	55
Quintile 1	106.8	1 5	106.9	1.5	-0.1	165
Quintile 2	113.8	1 3	113.9	1.3	-0.1	189
Quintile 3	117.9	1.2	118.1	1.2	-0.2	258
Quintile 4	124.5	.0	124.6	1.0	-0.1	295
Quintile 5	128.2	1.1	128.3	1.1	-0.1	275

Mathematics

Table A3.3 NMSSA mathematics achievement Year 4: Comparison of estimates using unweighted and weighted samples data

Year 4						
	Using unweighted data		Using weighted data			
	Mean	SE	Mean	SE	Difference	N
All	83.9	0.4	83.5	0.4	0.4	2105
Girls	82.5	0.6	82.1	0.6	0.4	1035
Boys	85.2	0.6	84.8	0.6	0.4	10 0
NZE	87.5	0.5	87.4	0.5	0.1	1328
NZE girls	85.9	0.7	85.8	0.7	0.1	655
NZE boys	89.0	0.7	88.9	0.7	0.1	673
Māori	75.2	0.9	74.8	0.9	0.4	439
Māori girls	73.0	1.3	72.6	3	0 4	217
Māori boys	77.3	1.2	77.0	1.2	0.3	222
Pacific	71.1	1.1	70.8	1	0.3	287
Pacific girls	71.0	1.6	70.4	1.6	0.6	142
Pacific boys	71.3	1.5	71.1	1.5	0.2	145
Asian	91.4	1.1	91	1.1	0.2	263
Asian girls	91.8	1.5	91.6	1.5	0.2	120
Asian boys	91.0	1.6	90.9	1.6	0.1	143
Quintile 1	68.7	1.0	68.6	1.0	0.1	316
Quintile 2	78.1	0 9	78.1	0.9	0.0	386
Quintile 3	83.6	0.9	83.6	0.9	0.0	347
Quintile 4	7.6	0.9	87.7	0.9	-0.1	419
Quintile 5	92.6	0.7	92.6	0.7	0.0	637

Table A3.4 NMSSA mathematics achievement Year 8: Comparison of estimates using unweighted and weighted samples data

Year 8						
	Using unweighted data		Using weighted data			
	Mean	SE	Mean	SE	Difference	N
All	117.1	0.5	116.6	0.5	0.5	1985
Girls	116.1	0.6	115.7	0.6	0.4	94
Boys	118.0	0.7	117.5	0.7	0.5	1 36
NZE	119.5	0.6	119.4	0.6	0.1	1222
NZE girls	118.2	0.8	118.2	0.8	0 0	575
NZE boys	120.7	0.8	120.5	0.8	0	647
Māori	108.3	0.9	107.9	0.9	4	448
Māori girls	107.9	1.3	107.4	1.3	0.5	192
Māori boys	108.6	1.2	108.3	1.2	0.3	256
Pacific	105.6	1.2	105.0	1.2	0.6	245
Pacific girls	104.8	1.7	04.0	1 7	0.8	107
Pacific boys	106.3	1.6	105 8	1.6	0.5	138
Asian	127.0	1.4	126 6	1.4	0.4	256
Asian girls	125.9	1.8	125.5	1.8	0.4	146
Asian boys	128.5	2 1	128.2	2.1	0.3	110
Quintile 1	102.3	1.1	102.3	1.1	0.0	239
Quintile 2	110.4	1 1	110.4	1.1	0.0	309
Quintile 3	115.7	1.0	115.7	1.0	0.0	446
Quintile 4	121.8	0.9	121.8	0.9	0.0	519
Quintile 5	125.0	0.9	124.9	0.9	0.1	472

Appendix 4:
Variance Estimation: NMSSA 2018

Contents:

Tables:

1. Introduction

This brief summary supports the general NMSSA variance estimation paper[10], with specific findings relating to data in NMSSA 2018.

Design effects were calculated using the data collected for the NMSSA 2018 mathematics assessment. The NMSSA mathematics assessment was completed by the entire NMSSA sample, and therefore provides the most complete information regarding the clustering of students in schools, and consequently the effect on variance estimation.

Design effects for the whole sample, and key sub-groups were investigated.

In general, through experience with calculating design effects each year, it has been noted that reducing th sample size by a factor of 0.7 for calculation of population statistics, accounts for most of the design ef ect related to the clustered nature of the NMSSA sample.

Design effects in 2018 mostly varied between about 1.0 and 2.0. While the design effects in some cas s are fairly large, the effect on the width of confidence intervals is small in practice. In each ase the increase in width of the 95% confidence intervals is less than 1 NMSSA scale score point.

It was recommended that for ease of calculation, and to absorb most of the variance b as caused by the NMSSA complex sample design, the standard multiplier of 0.7 should be used to f rm an effective sample size in the calculation of statistics dependent on sample size.

Tables follow showing the effect of the NMSSA comple s mple design for the 2018 mathematics assessment.

[10] A standard routine for assessing design effects in NMSSA was developed using NMSSA data over the years 2014 and 2015. See *Variance Estimation in NMSSA,* at https://nmssa.otago.ac.nz/reports/Variance_Estimation_NMSSA.pdf.

2. Tables of design effects

Table A4.1 Mathematics Year 4: Comparison of results for different variance estimation methods

Year 4	Mean[11] (SRS[12])	SE (SRS)	SE (TSL[13])	CI (SRS) (lower)	CI (SRS) (upper)	CI (TSL) (lower)	CI (TSL) (upper)	Design effect	CI w dth increase	CI width increase %	N	Effective N
All Year 4	0.51	0.03	0.04	0.45	0.56	0.44	0.58	1 86	0.0195	36	2105	1132
NZE[14]	0.77	0.03	0.04	0.71	0.84	0.69	0.86	1.65	0.0189	29	1158	702
Māori	-0.07	0.06	0.06	-0.18	0.04	-0.19	0.0	1. 6	0.0138	12	426	338
Pacific	-0.46	0.09	0.08	-0.63	-0.29	-0.61	-0.3	0.82	-0.0159	-9	184	226
Asian	1.08	0.07	0.08	0.94	1.22	0 92	1.24	1.35	0.0228	16	232	173
Female	0.42	0.04	0.05	0.35	0.50	0.32	0.52	1.81	0.0263	35	1020	564
Male	0.60	0.04	0.05	0.52	0.67	0.49	0.70	1.88	0.0285	37	1047	557
Female NZE	0.67	0.05	0.06	0.58	0.76	0.56	0.78	1.48	0.0202	22	560	379
Female Māori	-0.19	0.08	0.09	-0.34	-0. 3	-0 36	-0.01	1.20	0.0152	9	217	182
Female Pacific	-0.51	0.13	0.11	-0.76	-0 26	-0.73	-0.29	0.78	-0.0319	-13	89	121
Female Asian	1.06	0.10	0.12	0.87	1 26	0.83	1.30	1.47	0.0419	21	108	74
Male NZE	0.87	0.05	0.06	0.78	0 96	0.75	0.99	1.70	0.0284	30	598	353
Male Māori	0.05	0.08	0.09	-0 0	0.20	-0.12	0.22	1.31	0.0216	14	209	160
Male Pacific	-0.41	0.11	0.10	- 64	-0.19	-0.62	-0.21	0.85	-0.0184	-8	95	114
Male Asian	1.09	0.10	0.11	0.90	1.29	0.87	1.32	1.26	0.0242	12	124	100
Low decile	-0.27	0.05	0 06	-0.38	-0.17	-0.40	-0.15	1.30	0.0151	14	483	373
Mid decile	0.47	0.04	0.0	0.39	0.55	0.37	0.57	1.42	0.0157	19	772	545
High decile	0.98	0.04	0. 5	0.91	1.06	0.89	1.08	1.60	0.0198	26	850	532

[11] All results in table are quoted in logit uni exc t where ndicated.
[12] Simple random sample
[13] Taylor series linearisation m hod
[14] New Zealand European

Table A4.2 Mathematics Year 8: Comparison of results for different variance estimation methods

Year 8	Mean[15] (SRS[16])	SE (SRS)	SE (TSL[17])	CI (SRS) (lower)	CI (SRS) (upper)	CI (TSL) (lower)	CI (TSL) (upper)	Design effect	CI wid h increase	CI width in rease %	N	Effective N
All Year 8	2.62	0.03	0.04	2.56	2.68	2.54	2.70	1.82	0 0207	35	1985	1089
NZE	2.78	0.04	0.05	2.71	2.86	2.69	2.87	1.56	0.0186	25	1094	703
Māori	2.06	0.06	0.06	1.95	2.17	1.93	2.19	1.3	0.0188	17	448	328
Pacific	1.63	0.09	0.10	1.46	1.81	1.43	1.83	1. 0	0.0250	14	141	109
Asian	3.33	0.09	0.11	3.15	3.50	3.11	3.54	40	0.0333	18	231	166
Female	2.57	0.04	0.06	2.48	2.65	2.46	.68	1.81	0.0288	35	912	504
Male	2.68	0.04	0.06	2.60	2.76	2.57	2.79	1.86	0.0308	36	1034	557
Female NZE	2.70	0.05	0.06	2.59	2.80	2.57	2.82	1.55	0.0254	24	504	326
Female Māori	2.04	0.08	0.10	1.87	2.20	1 85	2.23	1.35	0.0270	16	192	142
Female Pacific	1.57	0.13	0.13	1.32	1.82	1. 3	1.82	0.99	-0.0031	-1	63	67
Female Asian	3.20	0.12	0.13	2.97	3 43	2.94	3.46	1.34	0.0359	15	141	106
Male NZE	2.86	0.05	0.07	2.75	2 96	2.73	2.99	1.53	0.0251	24	590	387
Male Māori	2.08	0.07	0.09	1.93	23	1.91	2.25	1.38	0.0262	18	256	186
Male Pacific	1.68	0.12	0.15	1.44	1.93	1.39	1.97	1.44	0.0490	20	78	55
Male Asian	3.52	0.15	0.18	3.23	3.81	3.18	3.87	1.44	0.0583	20	90	63
Low decile	1.90	0.06	0.07	78	2.01	1.76	2.03	1.36	0.0193	17	425	312
Mid decile	2.55	0.05	0. 6	2.46	2.64	2.44	2.66	1.48	0.0202	22	739	499
High decile	3.06	0.04	06	2.98	3.15	2.96	3.17	1.61	0.0233	27	821	512

[15] All results in table are quoted in logit ts excep h re indicated.
[16] Simple random sample
[17] Taylor series linearisati n method

Appendix 5:
Linking Social Studies across Cycle 1 and Cycle 2

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1. Introduction

In order to make comparisons across cycles, the National Monitoring Study of Student Achievement (NMSSA) carries out analyses in each learning area to link the assessment results. This document summarises the steps conducted to link the Nature of Social Studies (NSS) assessments in 2014 and 2018.

In 2014, the NSS scale was constructed using in-depth (interview and group/team) items administered to eight students per school. However, in 2018, both group-administered tasks (presented on computer taken by up to 12 students per school) and in-depth items were used to construct the NSS scale. Thus, the 2018 scale was considered to be a richer measure of the same construct. Both scales were psychometrically sound and robust measures. Because of these reasons NMSSA decided to link the 2014 scale to the existing 2018 scale (rather than the other way round).

2. Technical differences 2014 to 2018

Some technical details regarding estimation have changed between 2014 and 2018. Prima ly, plausible values have been introduced (since 2015) for calculating population estimates. Generating ets of plausible values for the student sample requires a slightly different estimation technique f om at u d in 2014 for calculating item parameters. These technical changes necessitated a re-ana ysis of the ass ssment data from 2014 so that it could be properly compared with the 2018 data.

The re-analysis of 2014 data has been done solely for the purposes of he NMSSA trend analysis. It means that estimates recorded in the 2014 NMSSA social studies rep r ann t be dir ctly compared with those in the 2018 report. Meaningful comparisons across time are restrict d to tho e reported in the trend analysis sections of the 2018 reports.

3. Reconstruction of the 2014 NSS scale

The 2014 social studies data was re-analysed with a pro ess that replicated the 2018 analysis as precisely as possible. In 2014 NMSSA used joint maximum likelih d estimation (JMLE) procedures to estimate both item and person parameters. The reconst tion of the da a involved using marginal maximum likelihood (MML) to estimate item parameters. B th e timation methods apply the Rasch model. The main difference between the two estimation proced res s tha MML assumes an underlying normal distribution for the student population, where s JMLE do s not.

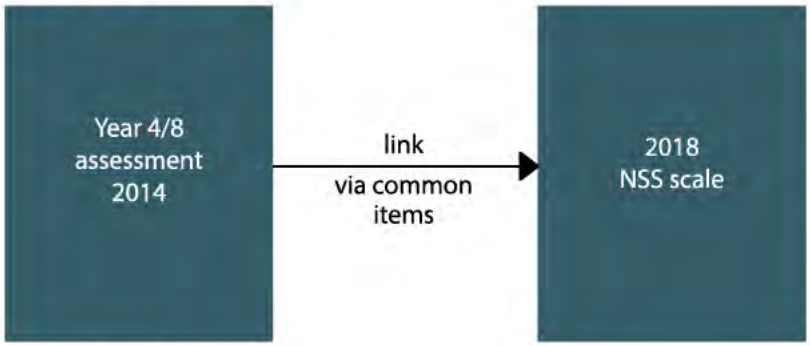
MML item parameters were g nerated for the 2014 data, and link item calibrations at both time-points were examined.

Linking process

We applied two approaches (see Figure A5.1) to link the 2014 and 2018 NSS scales:

- Design A: linking the (Year 4/8) 2014 scale to the (Year 4/8) 2018 scale
- Design B: separately linking the Year 4 and Year 8 data from 2014 to the 2018 scale.

Linking design A



Linking design B

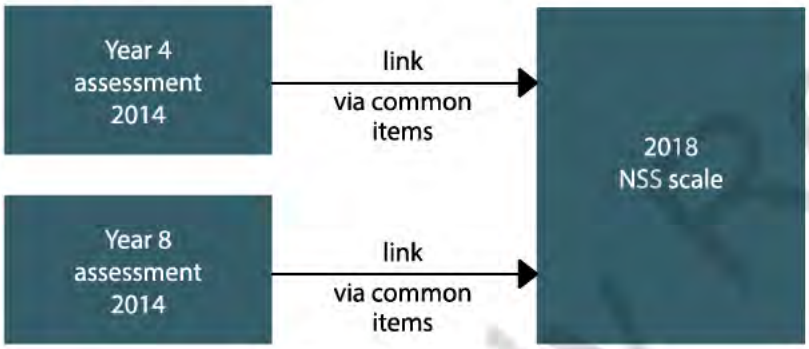


Figure A5.1 Linking schemes for NMSSA Nature of So ial Studies

To create a strong link between scales the two sets of item calibrations at different time points ideally require:

- as many items as possible
- a good spread of items across t e scale
- strong correlation betwe n the two sets
- similar standard devi tion in the two sets.

Both linking methods yield d very similar trend outcomes.

It was deci ed t u e the linking design A for reporting because, when compared with linking Year 4 and Year 8 separat ly, whole scale linking resulted in a set of linking items that better represented the construct (few r item had to be deleted), higher correlations between item calibrations, and a smaller difference b tw en standard deviations.

EAP[18] person estimates were generated for the 2014 data using transformed MML item parameter estimates, and the usual procedure for generating plausible values was carried out.

Linking outcomes

Of the 19 items chosen for linking, two items did not correlate well enough to be included in the link calculation. These items were eliminated from ensuing calculations. The remaining 17 items had a correlation of 0.98, and showed a good spread across the NMSSA NSS scale. The two sets of item parameters also recorded a similar standard deviation at both time points: 1.31 logits and 1.33 logits at 2014 and 2018, respectively.

[18] An expected a posteriori (EAP) estimate refers to the expected value of the posterior probability distribution of latent trait scores in a given case.

The standard deviations were sufficiently similar to warrant a simple shift on the NSS scale to bring the 2014 calibrations in line with the 2018 calibrations.

The transformation which takes the 2014 MML item parameters to the 2018 scale is:

$$\delta_i^{2017} = \delta_i^{2012} - 0.15\ logits,$$ where δ_i is the estimated parameter of *item i*

4. Trend analysis

The Year 4 achievement distributions shows an improvement between 2014 and 2018, while the overall Year 8 mean shows no change. Figure A5.2 depicts theoretical normal distributions based on the observed mean and standard deviation (in logits).

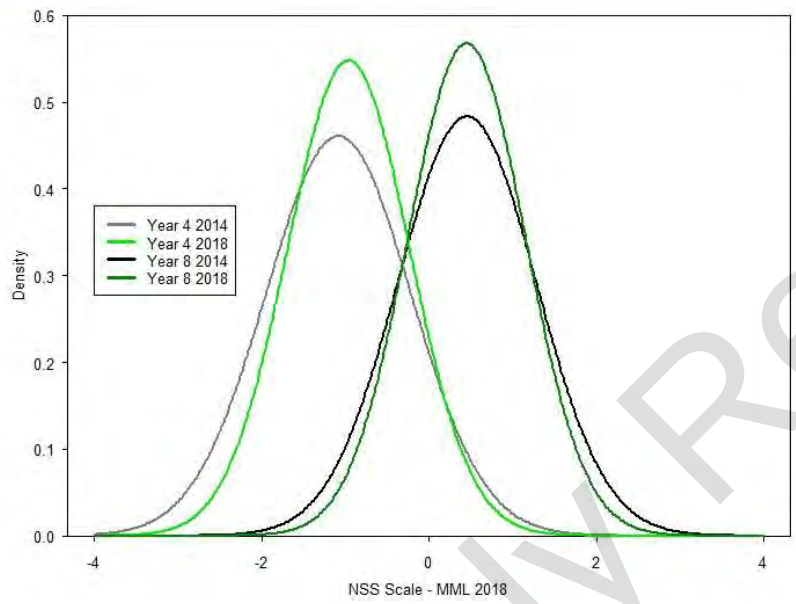


Figure A5.2 Comparative estimated distribu ons i 2014 nd 2018

More detailed findings from trend analysis are included in the 2018 Social Studies report[19].

Linking error

When linking two scales su h as these, a linking error should always be considered in the analysis. The size of the linking error s dependent on the differences between pairs of item parameters. In this case, since the correlation between the item parameters is very strong, the linking error is small (0.01 logits). The linking error was calcula d as

$$linki\ \ g\ error = \sqrt{\sum_{i=1}^{L}(\delta_i - \delta_i')^2 * \frac{L}{L-1}}$$, where L is the number of link items

Standard error on differences between means

The trend analysis involves examining differences between means at the two time-points for complete year levels and for key subgroups. The general formula for calculating confidence intervals around an observed difference is

$$1.96 * \sqrt{se_{pooled}^2 + linking\ error^2}$$

[19] *NMSSA Report 20 Social Studies 2018 – Key Findings.*

5. Alignment of the 2018 NSS scale to the NZ Curriculum

NMSSA has a particular interest in the achievement level of Year 4 students against level 2 of the *New Zealand Curriculum*, and the achievement level of Year 8 students against level 4 of the curriculum.

The 2014 curriculum alignment generated boundaries on the 2014 NSS scale to indicate curriculum level cut-scores. The cut-scores were developed by a group of teachers and social studies curriculum specialists in a curriculum alignment exercise described in the 2014 NMSSA social studies report. These cut-scores were then used to estimate how the Year 4 and Year 8 student populations were achieving against year-level appropriate curriculum expectations.

The 2014 curriculum cut-scores were located on a scale, which had been constructed using JMLE estimation. There is no direct transformation from the 2014 JMLE scale to the 2018 MML scale. The fi st step was to re-estimate the 2014 scale using plausible values, a procedure that was adopted afte 2014 Th 2014 MML scale was reconstructed and used for equating with the 2018 scale. Percentile eq ting was used to locate the curriculum cut-scores from the 2014 NSS scale on the 2018 NSS sc le. P entile equating assumes that the proportion of Year 4 students estimated to be achieving at o above vel 2, and the proportion of Year 8 students estimated to be achieving at level 4 or above, ho ld not vary with the estimation method. In other words, when the 2014 results are placed on the 20 8 s ale the proportion of students meeting expectations should be the same as was reported in 2014 gain t the original 2014 NSS scale. The cut-scores for 2018 using percentile equating were as follows:

Table A5.1 Final curriculum cut-scores on the 2018 NMSSA Nature of l Stu ie scale

	Level 2 (logit)	Level 2 (NSS units)	Level 3 (logit)	evel 3 (NSS units)	Level 4 (logit)	Level 4 (NSS units)
Year 4 & 8	-1.37	69	-0.33	98	0.70	127

Appendix 6:
Linking Mathematics and Statistics across Cycle 1 and Cycle 2

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1. Introduction

In order to make comparisons across cycles, the National Monitoring Study of Student Achievement (NMSSA) carries out analyses in each learning area to link the assessment results. This document summarises the steps conducted to link the Knowledge and Application of Mathematical and Statistical Ideas (KAMSI) assessment from 2013 with the Mathematics and Statistics (MS) assessment from 2018.

In 2013, the KAMSI scale was constructed using items from group-administered paper-and-pencil assessment. Another scale, called the Mathematical and Statistical Proficiencies (MSP) scale was constructed from in-depth interview tasks and performance activities, administered on a one-to-one basis. In 2018, both group-administered and in-depth items were used to construct the single MS scale. The s ale was initially constructed using only the group-administered items. The in-depth items were then added while the calibrations of the group-administered items were anchored.

While both 2013 and 2018 scales were psychometrically sound and robust measures, the 2018 cale was considered to be a richer measure of the same construct, and the decision was made to link th 2013 esults to the 2018 scale, using common group-administered items.

2. Technical differences 2013 to 2018

Some technical details regarding estimation have changed between 2013 and 2018 Primarily, plausible values were introduced in 2015 for calculating population estimates. G nera ing s ts of plausible values for the student sample requires a slightly different estimation technique f om that used in 2013 for calculating item parameters. These technical changes necessitated a r -analy is of he ssessment data from 2013 so that it can be properly compared with the 2018 data.

The re-analysis of 2013 data has been done solely for the purp ses of the NMSSA trend analysis. It means that estimates recorded in the 2013 NMSSA mathem tics and statistics report cannot be directly compared with those in the 2018 report. Meaningful comparisons across time are restricted to those reported in the trend analysis sections of the 2018 reports.

3. Reconstruction of the 2013 KAMSI scale

At each of Years 4 and 8, the data f om he 20 3 KAMSI assessment were re-analysed with a process that replicated the 2018 analysis as precisely as possible. This re-analysis involved using marginal maximum likelihood (MML) to estima e item pa ameters, where joint maximum likelihood estimation (JMLE) was used in 2013. Both es mation methods apply the Rasch model. The main difference between the two estimation procedures is tha MML assumes an underlying normal distribution for the student population, whereas JMLE doe not.

Linking Process

The 2013 KAMSI scale was constructed with a vertical link through about 800 Year 6 students who completed questions from both Year 4 and Year 8 assessments. This is a standard NMSSA method used to locate Year 4 and Year 8 students on a single scale. This method was used again in 2018. To minimise the aggregation of the vertical linking error across the two cycles, it was decided that MML parameters should be generated separately for the 2013 Year 4 data and the 2013 Year 8 data, with each of the year levels then being independently linked to the 2018 scale (see Figure A6.1).

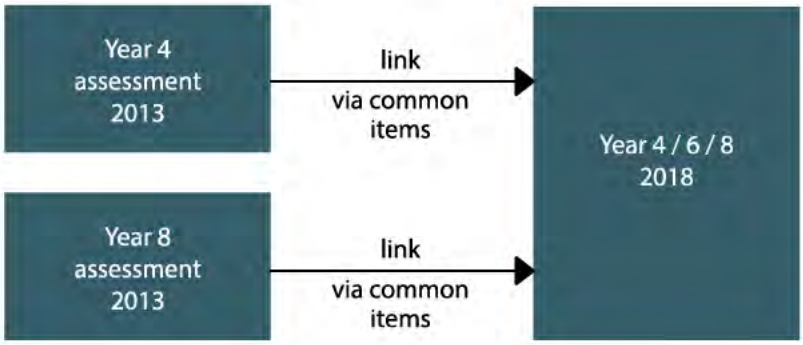

Figure A6.1 Linking scheme for NMSSA mathematics and statistics

For strong linking, there should be a high correlation between the ca ibration of the link items for 2013 and 2018, standard deviations should be approximately the sam for oth ets of calibrations, and item difficulties (calibrations) should cover as wide a range of he sc ossible. In order to achieve a strong link, it is sometimes necessary to remove some items from t e link item pool. In this case a small number of items was removed at each of the year levels. Using the remaining link items, a shift was applied to bring the 2013 calibrations in line with the 2018 ones This shift was calculated separately for Year 4 and Year 8.

For each year level, EAP[20] person estimates wer generated for the 2013 data using transformed MML item parameter estimates, and the usual proc dure or generating plausible values was carried out.

Year 4 linking outcomes

Of the 30 items that were available for linking, 28 were included in the link calculation. Those 28 items had a correlation of 0.98 and showed a reasonable spread across the scale. The two sets of item parameters had the same standard deviatio (1.10 logits).

To bring the 2013 alibrations in line with the 2018 calibrations, the following transformation was applied at Year 4:

$$\delta^{20\ 8} = \delta_i^{2013} - 0.18\ logits,$$ where δ_i is the estimated parameter of *item i.*

Yea 8 lin ing outcomes

Ther were 41 items available for linking, and 36 were included in the link calculation. The included items had a c elation of 0.98 and were spread across the scale. The standard deviations of the item parameters w re similar across the two time points: 0.90 logits for 2013 and 0.91 logits for 2018. These standard deviations were similar enough to warrant a simple shift.

To bring the 2013 calibrations in line with the 2018 calibrations, the following transformation was applied at Year 8:

$$\delta_i^{2018} = \delta_i^{2013} + 1.89\ logits,$$ where δ_i is the estimated parameter of *item i.*

[20] An expected a posteriori (EAP) estimate refers to the expected value of the posterior probability distribution of latent trait scores in a given case.

4. Trend analysis

The Year 4 achievement distributions showed very little difference between 2013 and 2018, while the overall Year 8 mean showed a slight improvement. Figure A6.2 depicts the theoretical normal distributions based on the observed means and standard deviations (in logits).

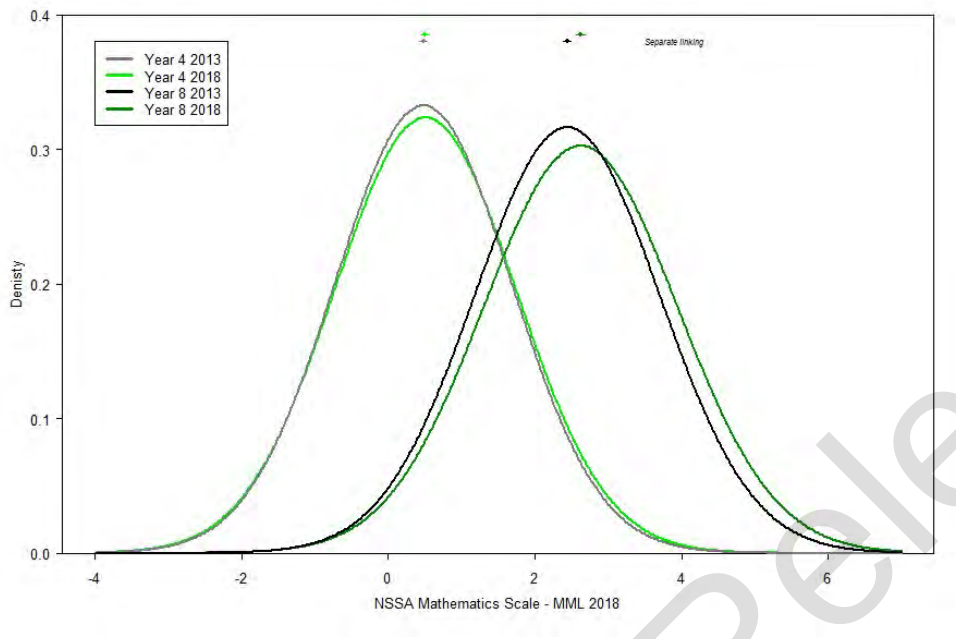

Figure A6.2 Estimated distributions of Mathematics and Statistics sca cores for 2013 and 2018

More detailed findings from trend analysis are included in the 2018 Mathematics and Statistics report[21].

Linking error

When linking two scales, a linking error sh uld be conside ed in the analysis. The size of the linking error is dependent on the differences between p irs o item parameters. In this case, since the correlation between the item parameters was very strong, the ink g erro was small: 0.04 logits at Year 4 and 0.03 logits at Year 8.

The linking error was calculated as: $\sqrt{\sum_{i=1}^{L}(\delta_i - \delta_i')^2 * \frac{L}{L-1}}$, where L is the number of link items

Standard error fo differe c s between means

Trend analysis inv lved examining differences between means at the two time-points for complete year levels and for key sub groups. The formula used for calculating the confidence interval around an observed difference was:

$$1.96 * \sqrt{se_{pooled}^2 + linking\ error^2}.$$

[21] *NMSSA Report 21 Mathematics and Statistics 2018 – Key Findings.*

5. Alignment of the 2018 MS scale to the NZ Curriculum

NMSSA has a particular interest in the achievement of Year 4 students against level 2 of the *New Zealand Curriculum*, and the achievement of Year 8 students against level 4 of the curriculum.

The 2013 curriculum alignment generated boundaries on the KAMSI scale to indicate curriculum level cut-scores. The cut-scores were developed by a group of teachers and mathematics curriculum specialists in a book-marking exercise described in the 2013 NMSSA mathematics and statistics report. These cut-scores were then used to estimate how the Year 4 and Year 8 student populations were achieving against year-level appropriate curriculum expectations.

The 2013 curriculum cut-scores were located on a scale which had been constructed using JMLE estim tion As there is no direct transformation from the 2013 JMLE scale to the 2018 MML scale, the first step w s to re-estimate the 2013 scale using plausible values, a procedure that was adopted in 2015. The 2013 MML scal was reconstructed and used for equating with the 2018 scale. Percentile equating was used t locate the curriculum cut-scores from the 2013 KAMSI scale on the 2018 MS scale. Percentile equating assu s that the proportion of Year 4 students estimated to be achieving at or above level 2, and the prop rtio of Year 8 students estimated to be achieving at level 4 or above, should not vary with the estim tion method. In other words, when the 2013 results are placed on the 2018 scale, the proportion of stu ent meeting expectations should be the same as was reported in 2013 against the original 2013 KAMSI scal

Because Year 4 and Year 8 results from 2013 have been linked separa ely t the 2018 scale, the mappings of the 2013 cut-scores on to the 2018 scale differ slightly when using perc ntil equating (see Table A6.1).

Table A6.1 Curriculum cut-scores on the 2018 NMSSA Mathema cs and S atistics scale

	Level 2 (logit)	Level 2 (MS units)	Level 3 (logit)	evel 3 (MS units)	Level 4 (logit)	Level 4 (MS units)
Year 4	-0.59	67	0.92	90	2.44	114
Year 8	-0.78	64	0.89	90	2.74	119

In order that the percentage of Year 4 s udents chieving at Level 2 or above, and the percentage of Year 8 students achieving at level 4 and above, emain consistent with what was reported in 2013, the level 2 cut-score was placed at -0.59 logits and the level 4 cut-score at 2.74 logits.

In locating the level 3 cut sco e the mid-point between the Year 4 level 3 cut-score (0.92) and the Year 8 level 3 cut-score (0.89) wa used. The level 3 cut-score was therefore located at 0.90 logits (logit cut-scores reported here have been round d to 2 decimal places).

Appendix 7:
NMSSA Assessment Framework for Social Studies 2018

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1. Introduction

This appendix describes the assessment approach that the National Monitoring Study of Student Achievement (NMSSA) took to assess social studies in 2018. It describes how social studies is set out in the *New Zealand Curriculum*[22] (NZC) and outlines the conceptual framework that guided the development of the Nature of Social Studies (NSS) assessment.

2. Social Studies in The New Zealand Curriculum

The NZC states:

> The social sciences learning area is about how societies work and how people can participate critical, active, informed and responsible citizens. Contexts are drawn from the past, presen and future, and from places within and beyond New Zealand.
>
> Through the social sciences, students develop the knowledge and skills to enable them to: be ter understand, participate in, and contribute to the local, national, and global communities in which they live and work; engage critically with societal issues; and evaluate the susta ability of alternative social, economic, political and environmental practices.
>
> Students explore the unique bicultural nature of New Zealand socie y that derives rom the Treaty of Waitangi. They learn about people, places, cultures, histories, and the econ mic world, within and beyond New Zealand. They develop understandings about how socie ies a e organised and function, and how the ways in which people and communities respond re hap d by different perspectives, values and viewpoints. As they explore how othe s see them elve , students clarify their own identities in relation to their particular heritages an contex s (p 30)

The assessment of the Nature of Social Studies (NSS) was derived from the achievement objectives in social studies and focused on four constructs: conceptual unde standing, active participation in society, values and perspectives, and using information. The constructs covered one or more of four conceptual strands of the social studies learning area.

Definition of constructs

Conceptual understanding (CU)

These are big ideas that students develop a ut society within social studies. The concepts relate to the four interrelated conceptual strands of soci l studies in the NZC (see next section). Students were assessed on the extent to which they w re ble to:

- be informed and cr ical in their understanding of social studies concepts
- apply, tran fer and extend their conceptual understandings across a range of contexts
- demon trate connections between multiple contexts.

Active part ipation n society (APS)

APS i be c nstructively involved in participating in, or observing, critically informed actions in relation to local or gl bal issues. Students were assessed on the extent to which they were able to:

- recognise the impact of their role in society
- identify opportunities for themselves or others to participate in society
- identify issues or problems
- identify how they or others can take action and/or make decisions based on knowledge and understandings
- recognise the personal or social significance of the contributions of self or others to society.

[22] Ministry of Education. (2007). *The New Zealand Curriculum.* Wellington: Learning Media.

Values/perspectives (VP)

Values are deeply held beliefs about what is important or desirable. They are expressed through the ways in which people think and act. Students were assessed on the extent to which they were able to:

- express values using evidence-based justifications
- recognise diverse values and perspectives in society
- critically analyse values and actions based on these values.

Using information (UI)

Using information requires the gathering and analysis of useful information to inform conclusions and support decision making. Students were assessed on the extent to which they were able to:

- frame questions for an inquiry
- identify appropriate sources of information
- analyse and respond to mathematical information
- present information using appropriate conventions
- use information to make or recognise valid generalisations or references.

Definition of conceptual strands

Identity, Culture and Organisation (ICO)

Students learn about society and communities and how they function. They also learn about the diverse cultures and identities of people within those communities nd a out he effects of these on the participation of groups and individuals.

Place and Environment (PE)

Students learn about how people perceive, represent interpret, a d interact with places and environments. They come to understand the relationships that exist between people and the environment.

Continuity and Change (CC)

Students learn about past events, experiences and actions, and the changing ways in which these have been interpreted over time. This helps them to understand the past and the present and to imagine possible futures.

The Economic World (EW)

Students learn about the ways in hich people participate in economic activities and about the consumption, production nd di tribution of goods and services. They develop an understanding of their role in the economy and of h w economic decisions affect individuals and communities.

What does prog ess in social studies look like?

The broad expec ation of social studies in the NZC for levels 2 and 4 are expressed as the following Achieveme t Objec ves (AOs) in Table A7.1.

Table A7.1 Curriculum level 2 and level 4 achievement objectives in social studies

Social Studies achievement objectives	
Level 2	**Level 4**
Students will gain the knowledge, skills and experience to understand: • that people have social, cultural and economic roles, rights and responsibilities • how people make choices to meet their needs and wants • how cultural practices reflect and express people's customs, traditions and values • how time and change affect people's lives • how places influence people and people influence places • how people make significant contributions to New Zealand's society • how the status of Māori as tangata whenua is significant for communities in New Zealand.	Students will gain knowledge, skills and experience to understand: • how the ways in which leadership of groups is acquired and exercised have consequences for communities and societies • how people pass on and sustain culture and heritage for different reasons and that this has consequences or people • how exploration and innovation create oppo u ities and challenges for people, places and envir nme • that events have causes and effects • how producers and consumers exe cise the ights and meet their responsibilities • how formal and inf rmal g oup ma e decisions that impact on communit s • how people parti i te in ividually and collectively in response to commun ty chal enges.

3. Curriculum coverage in the NSS assessment

Many questions in the NSS assessment covered more than on construct and more than one conceptual strand. Seventeen tasks were included in the assessment programme, six of which were link tasks from 2014. A range of assessment approaches were used to assess the tasks: computer and paper-and-pencil presented tasks, interviews, group, team (of 4); and t e settings in which the questions were located: New Zealand, global or 'other'.

Table A7.2 summarises the relative we gh ing iven to each of the elements in the assessment framework for the NSS. Represented most strongly in th NSS assessment were: questions about identity, culture and organisation (14), conceptual understa ding (17), and located in a New Zealand context (14).

Table A7.2 The number of sks by trand, aspect, setting and assessment approach

Element	Numbe of asks with a focus on each strand, construct, setting and assessment approach (Total number of tasks = 17)			
Strand	Id ntity Culture & Organisation 14	Place & Environment 7	Continuity & Change 5	Economic World 3
Const	Conceptual understanding 17	Active participation in society 8	Values / perspectives 12	Gathering and analysing information 11
Setting	New Zealand 14	Global 5	Other 3	
Assessment approach	Interview 7	Group (GAT) 8	Team 3	

Table A7.3 shows the coverage of the NSS framework by task, strand, concept, construct, setting and assessment approach. The Kai Moana task, for example, covered two constructs – ICO and PE; two conceptual strands – CU and VP: Status of Māori as tangata whenua and Use of resources and Sustainability. The task was set in a New Zealand context and the assessment approach used an interview. The marking schedule for Kai Moana is presented in Table A7.4. It illustrates how constructs and strands overlap within a task.

Table A7.3 Curriculum coverage in the Nature of Social Studies assessment

	Strands and Concepts		Construct				Setting[1]	Approach[2]
Task Title	**Strands**	**Concepts**	**CU**	**APS**	**VP**	**UI**		
Good Sorts	ICO EW	Benefitting community through social action Market and opportunity	✓	✓			NZ	G
Food Waste	ICO PE CC	Social action Sustainability Cause and effect; Future focus	✓	✓		✓	NZ/ Global	G
Making a Difference	ICO	Common good; Social action Roles and responsibilities Volunteering; Leadership	✓	✓	✓	✓	NZ	G
A Letter Sent Home	ICO CC	Impact of change on people's lives Roles in society	✓			✓	NZ/ Gl l	G
Special to Our People	ICO CC	Cultural diversity; Status of Māori Identity; Values; Treaty Society's attitudes changes over time	✓	✓	✓		Z	I
Scaring the Monkeys	ICO	Roles and responsibilities; Community; Consequences of actions	✓	✓	✓	✓	Other	G
Mapping Aotearoa/ New Zealand	ICO PE	Place names reflect identity, culture and heritage; Collaboration; Roles and responsibilities Place names; Location How people record important features of places and environments	✓	✓	✓	✓	NZ	T
Digging Up the Past	CC	Valuing the past	✓		✓	✓	NZ	I
Mission Possible	PE	Location; Natural features; Environme t; How people record feat es of portan places	✓		✓	✓	Other	G
Fiapule	ICO	Families; Culture; Celebrations; Relationships	✓		✓	✓	NZ	G
Kai ora Honey	ICO PE EW	Whanau/family; Cu u l value ; Ancestral land; esou es; Values-b sed bus ness decision making	✓		✓	✓	Global	G
Fudge for the school fair (LINK)	EW	Facto affecting p ing; Profit; ctors i luencing people's purchasing dec ions	✓		✓	✓	NZ	I
Kai Moana (LINK)	ICO PE	Status Māori as tangata whenua Use of resources; Sustainability	✓		✓		NZ	I
Graffiti (LINK)	C PE	H w formal and informal groups make decisions How people view and use places differently	✓	✓	✓		NZ	I
Moving Here (LINK)	ICO PE CC	Cultural diversity and interaction Effect of people on the environment Cultural interaction can change culture over time	✓		✓		Global NZ	I
Cultur Symbols (LINK)	ICO	What constitutes culture; How symbols communicate identity	✓				NZ Asia	T
When Disaster Strikes (LINK)	ICO	Social responsibility; How people respond individually & collectively	✓	✓			Global NZ	T

Setting[1]: The settings identified for the 2018 social studies tasks were those identified in the 1997 Social Studies in the New Zealand Curriculum document, p. 20: New Zealand, The Pacific, Europe, Asia, Other Settings, Global Settings.

Approach[2]: I = Interview, G = Group, T = Team

Table A7.4 Marking rubric for the Kai Moana task

Title:	**KAI MOANA**	**Level:**	4 & 8
Task Info:	**3 cards, 3 'big ideas' words**	**pproach:**	Interview

Col 1	Q1. Why do we have laws about the amount of seafood and the size of seafood people can take?		CONSTRUCTS: Conceptual Understanding
SCORE:	**0**	**1**	**2**
Criteria:	No response/don't know/unsure Response not relevant e.g. meal size	Surface e.g. extinction of species; people will tak too many; won't be any more left; they'll die out	Deeper .g. sustainability considering others **and** th implications; considering future - leave small ones to grow; cultural value of giving back to the sea
Conceptual Understanding *Use of resources and sustainability*	*Demonstrates no understanding of the concepts*	*Demonstrates understanding of onc pts (s ace)*	*Demonstrates understanding of abstract concepts (deep)*

Col 2	Here is an opinion some people have about 'Customary Rights' for Māori. Q2. Why might people agree with that? Q3. What do you mean by _____? ***OR*** *Can you tell me more about* ____ ___ *(* (stud nt response from Q2) Q4. Why might people disagree with that? Q5. What do you mean by _____? ***OR*** *Can you tell me more about* _ ___*?(* (studen response from Q4)		CONSTRUCTS: Values & Perspectives Conceptual Understanding
SCORE:	**0**	**1**	**2**
Criteria:	No response/don't know/ unsure Response not relevant Only gives 1 point of view at a **surface** level	S fac **both** v ewpoints recognised e.g. been giv n righ hey need more for a tangi; it's the law; nfair they get more	Deeper connects with culture/beliefs (one side) e.g. Māori as tangata whenua; we all have equal rights, so it should be the same for all; sacredness of seafood to Māori; discrimination
Recognising diverse values and perspectives	*Unable to explain others' values positions*	*Explains others' values on a simple/surface level*	*Explains others' values on a complex/deep level*
Conceptual Understanding *Status of Māori as tangata whenua*	*Demonstrates no understanding of th concept*	*Demonstrates understanding of concrete concepts (surface)*	*Demonstrates understanding of abstract concepts (deep)*

Col 3	Q6. Sustainability, Rules, Responsibility Use these big ideas together, to tell me what they have to do with gathering seafood or kai moana.		CONSTRUCT: Concept al Understanding
SCORE:	**0**	**1**	**2**
Criteria:	No response/don't know/ unsure Response not relevant Only 1 concept discussed	Talks about 2 or 3 individual concepts in relation to kai moana	Explanation with connec ons between 2 or 3 concept in re tion kai moana
Connection between concepts	*Shows no awareness of how concepts are connected*	*Explanation of concepts within a specified context*	*Complex/deepe connection of concepts*

Col 4	Q7. Where else might these big ideas be important? (sustainability, responsibility and rules) Q8. How are these big ideas important in those places?		CONSTRUCT: Conceptual Understanding
SCORE:	**0**	**1**	**2**
Criteria:	No response/don't know/ unsure Response not relevant	Explains 1–3 individual wo ds in another context/s e.g. follow rules on road or t sch ol	Explains linked words clearly (2 or 3 words) to a context e.g. rules/responsibilities – follow road rules and this shows you are a responsible driver
Transferring and connecting concepts to different contexts	*Unable to transfer the concepts to a different context*	*Limited transfer of con epts to a different context*	*Clear transfer and linking of concepts to different context*

4. Key competencies, literacy and numeracy in social studies

All of the NZC key competencies are enacted within the social studies curriculum. NMSSA monitors the development of the key competencies by exploring how well students demonstrate these, through discussion or in writing, to meet curriculum purposes.

While the assessment tasks in social studies were focused on achievement, the literacy, numeracy and key competency demands were identified and assessed from these authentic social studies purposes. Table A7.5 sets out the definition of key competencies and how they were developed in social studies.

Table A7.5 Definition of key competencies and how they were developed in social studies

Key Competency (NZC)	Developed in social studies when students:
Thinking	• Pose questions, collect and analyse information, considering varying va s and responses made by people and groups, and evaluate findings i a cr ical a d informed manner • Are able to examine/challenge assumptions and percep s
Using language, symbols and texts **Literacy and numeracy across the curriculum**	• Use and make meaning of the wide range of literacie inh ent in the social sciences, including knowledge of texts such as n wspa ers, gr phs, statistics, maps, visual and oral media and so on • Understand how ideas are represented, v suali ed and constructed e.g. map, table, timeline, graph
Managing self	• Manage themselves thro hout a s cial inquiry approach by acting in ways that are enterprising, resourceful, rel b e and resilient
Relating to others	• Interact effectively with others, li en and respond to other points of view, values and perspectives, and ecognise alternative responses to social topics, themes and issues in s ciety • Are able to w rk collab tively with others
Participating and contributing	• Work and l rn co perativ y in groups within the school and their communities and now abo the rights, roles and responsibilities of themselves and others • U ders nd h w they are able to be active in society now and in future • Ack owledge how critical, responsible and informed they are in their participation in s ety

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Appendix 8:
NMSSA Assessment Framework for Mathematics and Statistics 2018

Contents:

Tables:

1. Introduction

This appendix outlines the conceptual framework used to support the development of the 2018 mathematics and statistics assessment.

2. Mathematics and statistics in The New Zealand Curriculum

Mathematics and statistics in *The New Zealand Curriculum* (NZC) (Ministry of Education, 2007) is about:

> … the exploration and use of patterns and relationships in quantities, space and time. Statistics is the exploration and use of patterns and relationships in data. These two disciplines are related but different ways of thinking and of solving problems. (p. 26)

The purpose for learning mathematics and statistics is to: 'equip students with effective means for investigating, interpreting, explaining and making sense of the world in which they live (p. 6). Furthermore:

> By studying mathematics and statistics, students develop the ability to think cre tively, critically, strategically and logically. They learn to structure and to organise, to ca ry out procedures flexibly and accurately, to process and communicate information, and to enjoy inte e tual challenge. (p. 26)

Achievement objectives in the mathematics and statistics learning area orga ised into three strands for Levels 1–6: number and algebra; geometry and measurement; and s atistics Relative weightings for the three strands at each of these levels are graphically represented i NZ as a venn diagram. According to the NZC, 'It is important that students can see and make sense o the many connections within and across these strands' (p. 26).

3. Continuity between the 2013 and 2018 mathematics and statistics frameworks

The NMSSA project team began development for the 20 8 study with an established item collection used in 2013. Items in the 2013 group-adm niste ed tasks (GAT) were revised, taking into consideration their performance as measurement tasks in 2013 plus the balance of coverage across the strands and mathematical competencies of problem-solving, reasoning and communicating. A small collection of new items was developed to supplem nt those retained from 2013. The in-depth items, administered to individual students by a t ache assessor, were revised to strengthen a dual focus on spatial reasoning and problem-solving, as recommended by the NMSSA Curriculum Advisory Panel (CAP) for mathematics and statistics. A mino focus on fractions and percentages was also included, in line with the CAP recommendations. key consideration for the review of the in-depth tasks was the opportunities they afforded students o demonstrate mathematical competencies.

Table A8.1 compares the achievement measure used in the 2018 programme with those used in 2013.

Table A8.1 Comparison of the achievement measures used in 2013 and 2018 for mathematics and statistics

2013	2018
Two achievement measures were developed in 2013, leading to two scales: *Knowledge and Application of Mathematical and Statistical Ideas (KAMSI);* and *Mathematical and Statistical Proficiencies (MSP)*. The correlation between the two measures was relatively high (.79 at Year 4 and .87 at Year 8) indicating that they measured similar skills and competencies.	The two achievement measures from 2013 were combined into one measure and one scale: *Mathematics and Statistics (MS)*. Existing assessment tasks and almost all new tasks, both paper-and-pencil and in-depth, contributed to the scale. Three new in-depth tasks were not developed to contribute to the scale (and will be reported on separately). These tasks focused on spatial reasoning and mathematical competencies: problem-solving (both individual and collaborative); reasoning; nd communicating.
The KAMSI assessment was a group-administered paper-and-pencil assessment that covered the three strands of the mathematics and statistics learning area. The MSP tasks included performance and interview tasks to assess three areas of proficiency: understanding; reasoning strategies and mathematical procedures; and communication.	The MS assessment comprised both pencil-an -pape nd in-depth tasks, which together covered the three strands of the mathematics and statistics learn ng a a. Th i depth tasks also included explicit opp rtu itie o assess students' mathematical compete cies a d col aboration skills.

4. The relationship of the framework to NZC

The 2018 NMSSA study assessed students' knowledge nd ap licati n of mathematical and statistical ideas across the three content strands described by the ma hemati d statistics achievement objectives in NZC. Across the strands, the assessment programme inc rporated an emphasis on problem-solving, reasoning and communicating. As much as possible, assessment items were set in meaningful contexts, and involved students thinking mathematically and statis ically, solving problems and modelling situations – consistent with NZC.

In order to be able to make an overall claim abo t studen s' achievement of the curriculum expectations at Year 4 and Year 8, aspects of the achievement obj ctive for mathematics and statistics have been broken into three key validity sub-claims at each level (ee Tables A8.2 and A8.3). These have been further broken down into what students, who achiev highly at each year level, will be able to do and what they will know.

Table A8.2 Key validity sub-claims for the Mathematics and Statistics assessment: Year 4

	Sub-claims	Students will be able to:	Students will know:
NUMBER	Students solve number problems, using appropriate mental or written methods in flexible ways.	• use a range of additive strategies with whole numbers and fractions, including counting on and back, combining and partitioning • use simple multiplicative strategies with whole numbers and fractions, including equal sharing, skip counting, repeated addition, combining and partitioning.	• forward d backward counting sequences with whole numbers to at east 1 00 • how man ones, tens and hundreds are in whole numbers to at l st 1,0 0 • fra tions in everyday use group gs to 10 • iples of 10 and 100 that add to 100 and 1,000 how to write simple equations • the order of whole numbers and unit fractions • numbers can be represented with structured equipment, e.g. on a number line, an abacus, or with place value blocks.
GEOMETRY	**Shape** Students can recognise and use the properties of shapes.	• identify the plane shapes found in objec • recognise drawings and models of simple ob ects.	• the names of simple two-dimensional shapes and some of their properties.
	Position and orientation Students can describe and interpret directions about position and movement.	• use simple maps to show position a d direction • describe different view and athway from locations on a map using grid references, tur s and p ints of the compass • give clear instructions to re- ient an ob ect.	• the language for turns (clockwise and anticlockwise, right and left), and the main compass points.
	Transformation Students can recognise and use the symmetries of shapes.	• predict and describ the t nsfo mation (reflection, rotation, translation) that have mapped one object onto another, and the symmetry of sh pes	• the language of transformation.
PROBLEM-SOLVING, REASONING & COMMUNICATING	Students can clearly communicate the strategies they plan to use to solve problems and evaluate their effectiveness.	• re-phrase a word problem and identify key information. describe an ended strategy • e nd dapt their strategy as needed to solve a problem and g v a clear xplanation of the strategy they used • cogn se when they are unsuccessful and suggest alternative strategies that could lead to a solution • ident y patterns and relationships in a simple problem that will hel them solve more difficult versions of the problem.	• recording (e.g. tally marks, simple equations) is useful for tracking thinking and supporting the communication of strategies.

Table A8.3 Key validity sub-claims for the Mathematics and Statistics assessment: Year 8

	Sub-claims	Students will be able to:	Stu s will know:
NUMBER	Students can calculate, using appropriate mental or written methods in flexible ways.	• use a range of multiplicative strategies flexibly when operating on whole numbers, fractions, decimals and percentages • use a range of addition and subtraction strategies flexibly on whole numbers, decimals, equivalent fractions and integers • find fractions, decimals and percentages of amounts expressed as whole numbers, simple fractions and decimals • apply linear proportions, including ordering fractions.	• equivalent de mal an percentage forms for everyday fracti ns • the elati e s e and place value structure of positive and negativ inte ers and decimals to three places • fra tion d percentages in everyday use • ommonly used fraction, decimal and percentage conversions the rder of simple fractions and decimals • simple equivalent fractions the notation for square roots • numbers can be represented with structured equipment, e.g. on a number line, an abacus, or with place value blocks.
GEOMETRY	**Shape** Students can recognise and use the properties of shapes.	• identify classes of two- and three-dim nsional h es by their geometric properties • relate three-dimensional models to two-dimensional representations, and vice versa.	• the names of simple two- and three-dimensional shapes, and the geometric terms for the properties of shapes.
	Position and orientation Students can describe and interpret directions about position and movement.	• interpret locations and directions sing compass directions, distances, and grid re erenc s • describe different views nd pathw s from locations on a map using grid references turns nd points of the compass • give clear instruct ons to e-or nt an bject. interpret verbal instructions to v uali e the re-orientation of an object.	• the language of direction and position.
	Transformation Students can recognise and use the symmetries of shapes.	• predict and d scrib the ansformations (reflection, rotation, translation) tha have mapped one object onto another • use the inva ian properties of figures and objects under tr nsfo mations.	• the language of transformation.
PROBLEM-SOLVING, REASONING & COMMUNICATING	Students can clearly communicate the strategies they plan to use to solve problems and evaluate their effectiveness.	• re phrase word problem and identify key information. desc be a detailed and logical strategy • us and adapt their strategy as needed to solve a problem and giv a clear detailed explanation of the strategy they used ecognise when they are unsuccessful and suggest alternative strategies that will almost certainly lead to a solution • generalise patterns and relationships in simple problems that will enable them to solve more difficult versions of the problem and predict unknown amounts in a number sequence.	• making a table to record results can facilitate identifying patterns • algebraic notation is an efficient way to predict unknown numbers in a given sequence.

Table A8.4 shows the spread of items developed for the 2018 study across the strands and competencies. The relative weighting of the three strands approximately reflects the NZC (number and algebra: 60 percent; measurement and geometry: 28 percent; and statistics: 12 percent).

Table A8.4 Coverage of items across strands and competencies in the mathematics and statistics learning area of NZC

Domain	Aspect	Year 4		Year 8	
		GAT items	In-depth items	GAT items	In-depth items
Number	Number knowledge	9	10	11	13
	Number strategies	24	3	26	3
Algebra	Patterns and relationships	6	1	5	1
	Equations and expressions	4	-	8	
Measurement	Measurement	11	-	11	-
Geometry	Shape	6		5	
	Position and orientation	3	3	4	3
	Transformation	2	-	5	-
Statistics	Statistical investigation	5	-	10	-
	Statistical literacy	2	-	-	-
	Probability	3	-	3	-
Mathematical competencies*	Problem-solving, reasoning and communicating	-	4	-	4

* Four in-depth items explicitly focused on students mathem tic l competencies. Three of these items did not contribute to the MS scale and are reported on descriptively as p t of the Insights Report for teachers. Elements of mathematical competencies were also incorporated in some of the GAT tasks but were not an assessment focus, so are not indicated in the table.

NMSSA • CYCLE 2

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Achievement in mathematics and statistics

Look out for Insights for Teachers Mathematics at https://nmssa.otago.ac.nz

Summary of results from the 2018 National Monitoring Study of Student Achievement

NMSSA Wānangatia te mutanga tauira National Monitoring Study of Student Achievement 2018

NMSSA in 2018

The National Monitoring Study of Student Achievement (NMSSA) is designed to assess student achievement across the New Zealand Curriculum (NZC) at Year 4 and Year 8 in English-medium state and state-integrated schools.

In 2018 the study focused on mathematics and statistics, and social studies. Mathematics and statistics (generally referred to as 'mathematics' to support readability) was last assessed in 2013, and social studies in 2014.

The NMSSA mathematics study

In 2018 NMSSA assessed achievement in mathematics using a nationally representative sample of about 2,100 students from 100 schools at each of Year 4 and Year 8. The assessment included one-to-one interviews, a collaborative team activity, and short computer-interactive and written-response tasks. The assessment included items from across the three content strands: number and algebra, geometry and measurement and statistics.

Scores on the assessment were located on the Mathematics and Statistics (MS) measurement scale (see graph at top right). MS scale scores ranged from about 30 to 180 MS units, with an average of 100 and a standard deviation of 20. Tasks that were used in both 2013 and 2018 allowed score comparisons to be made.

Questionnaires were used to gather information about teaching and learning in mathematics from students, teachers and principals.

Key findings regarding achievement

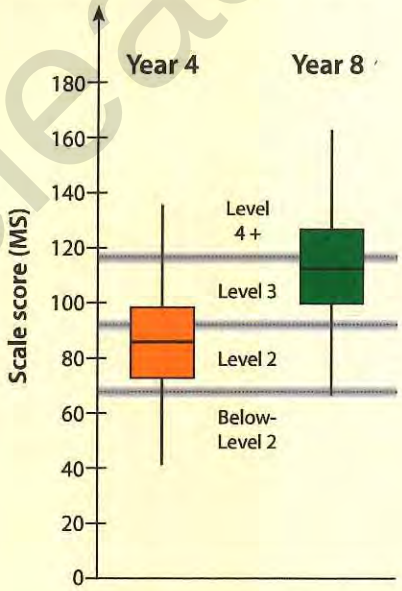
Results from 2018

- In Year 4, 81 percent of students achieved at or above curriculum expectations (Level 2). In Year 8, 45 percent of students achieved at or above curriculum expectations (Level 4).
- Between Year 4 and Year 8 students made, on average, about 8 MS units of 'progress' per year.
- Boys scored higher, on average, than girls by 3 MS units at Year 4 and 2 MS units at Year 8.
- Non-Māori students scored higher, on average, than Māori students by 11 MS units at both year levels.
- Non-Pacific students scored higher, on average, than Pacific students by 15 MS units at Year 4 and 13 MS units at Year 8.
- At both year levels, students from high decile schools scored higher, on average, than those from mid decile schools, who, in turn, scored higher than those from low decile schools. At Year 4, the difference between the average scores for students in the high and low decile bands was 20 MS units. At Year 8, it was 18 MS units.

Changes in achievement between 2013 and 2018

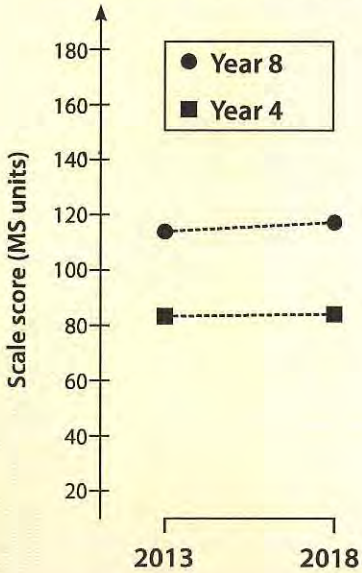
- Overall, average achievement in Year 8 was higher than in 2013 by 3 MS units. Differences in the overall average scores for Year 4 students between 2013 and 2018 were not statistically significant.
- Statistically significant increases in average achievement were recorded for Year 4 boys, Year 8 girls, Year 8 boys, Year 8 Pacific students, and for Year 8 students in low decile schools.

Distribution of Year 4 and Year 8 students' scores on the *Mathematics and Statistics* (MS) scale in 2018



The blurred lines *(above)* show the boundaries between curriculum levels. The lines are blurred to indicate the uncertainty involved in defining precise boundaries.

Change in average scores for Year 4 and Year 8 students on the *Mathematics and Statistics* (MS) scale between 2013 and 2018



MINISTRY OF EDUCATION TE TĀHUHU O TE MĀTAURANGA

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NZCER Rangahau Mātauranga o Aotearoa

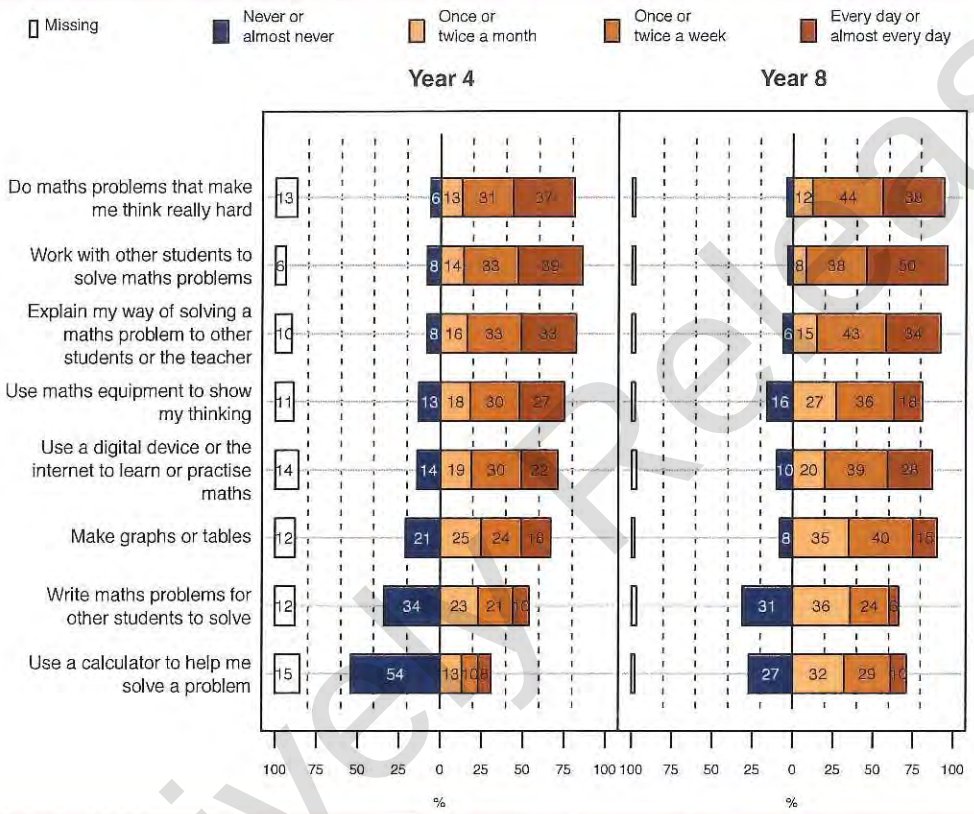
Students' attitude to mathematics and confidence in mathematics

- Most students were positive about learning mathematics at school and expressed confidence as mathematics learners.
- Boys, in general, were more positive than girls about mathematics and expressed greater levels of confidence.
- Most students rated the difficulty of their mathematics learning as 'about right for me'.

Opportunities to learn mathematics at school

Students indicated how often they were involved in a range of opportunities to learn mathematics at school (see figure below). For the majority of students, most activities happened 'at least once or twice a month'. 'Using a calculator to help solve problems' and 'writing maths problems for other students to solve' stood out in terms of the proportion of students who responded with 'never'.

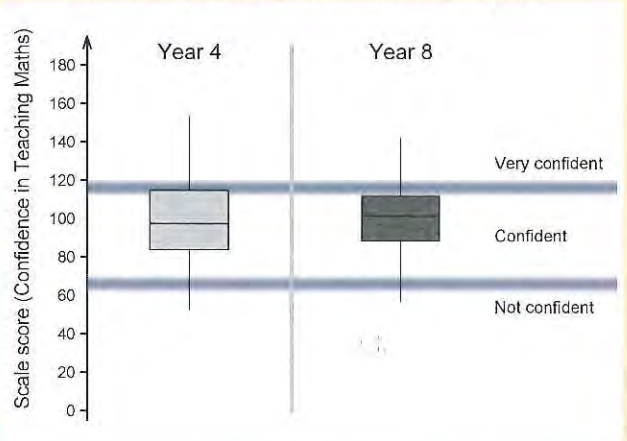
Opportunities for Year 4 and Year 8 students to learn mathematics



Teachers' and principals' perspectives on mathematics

- Year 8 teachers were more likely than Year 4 teachers to indicate that they had a qualification related to mathematics.
- Most teachers indicated that they enjoyed teaching mathematics and were confident about teaching it.
- Most teachers (at least 90 percent) at both year levels indicated students spent at least 3 hours a week learning mathematics at school.
- Around 80 to 85 percent of teachers at each year level reported using ability group-based activities on at least a weekly basis.
- Over half of teachers reported that they observed a colleague teach mathematics no more than once a year.
- About half of teachers rated the professional support they received for teaching mathematics as 'good' or 'very good'.
- Over 80 percent of principals rated their school's provision for learning in mathematics as either 'good' or 'very good'.
- In general, principals at both year levels were positive about the capabilities of the teachers in their schools to deliver the mathematics curriculum.

Distribution of teachers' scores on the Confidence in Teaching Mathematics scale



Achievement in social studies

Look out for Insights for Teachers Social Studies at https://nmssa.otago.ac.nz

Summary for teachers and principals of results from the 2018 National Monitoring Study of Student Achievement

NMSSA Wānangatia te pūkenga tohua National Monitoring Study of Student Achievement 2018

NMSSA in 2018

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In 2018 the study focused on mathematics and statistics, and social studies. Mathematics and statistics was last assessed in 2013, and social studies in 2014.

The NMSSA social studies study

In 2018 NMSSA assessed achievement in social studies of a nationally representative sample of about 1,200 students from 100 schools at each of Year 4 and Year 8. The assessment included one-to-one interviews, a collaborative team activity, and short computer-interactive and written response tasks. The assessment covered aspects of conceptual understanding from all strands and social inquiry (values and perspectives, active participation in society and using information) in a wide range of contexts.

Scores on the assessment were located on a Nature of Social Studies (NSS) measurement scale (see graph at top right). Scores range from about 30 to 180 NSS units, with an average of 100 and a standard deviation of 20. Tasks that were used in both 2014 and 2018 allowed score comparisons to be made.

Questionnaires were used to gather information about teaching and learning in social studies from students, teachers, and principals.

Key findings regarding achievement

Results from 2018

- In Year 4, 73 percent of students achieved at or above curriculum expectations (Level 2). In Year 8, 37 percent of students achieved at or above curriculum expectations (Level 4).
- Between Year 4 and Year 8, students made, on average, about 10 NSS units of 'progress' per year.
- Girls scored higher, on average, than boys by 4 units at Year 4 and 8 NSS units at Year 8.
- At both year levels, non-Māori students scored higher, on average, than Māori students by about 10 NSS units.
- Non-Pacific students scored higher, on average, than Pacific students by about 12 NSS units at each year level.
- At both year levels, students from high decile schools scored higher, on average, than those from mid-decile schools, who, in turn, scored higher than those from low decile schools. The difference between the average scores for students in the high and low decile bands was 18 NSS units.

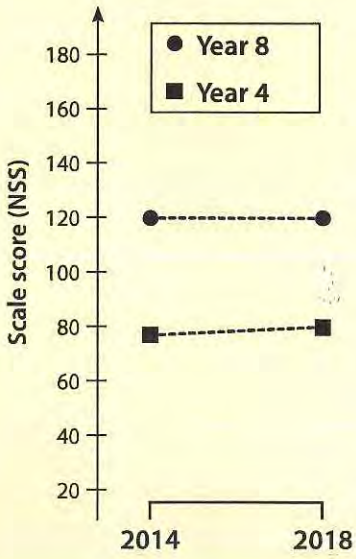
Changes in achievement between 2014 and 2018

- Year 4 students' in 2018 scored, on average, 4 NSS units higher than in 2014. In Year 8, there was no change between 2014 and 2018.
- Statistically significant increases in average achievement were recorded for Year 4 girls, Year 4 Māori students, Year 4 Pacific students, Year 4 Asian students and Year 8 students in low decile schools.

Distribution of Year 4 and Year 8 students' scores on the *Nature of Social Studies* (NSS) scale in 2018

The blurred lines *(above)* show the boundaries between curriculum levels. The lines are blurred to indicate the uncertainty involved in defining precise boundaries.

Change in average scores of Year 4 and Year 8 students on the *Nature of Social Studies* (NSS) scale between 2014 and 2018



MINISTRY OF EDUCATION TE TĀHUHU O TE MĀTAURANGA

UNIVERSITY of OTAGO Te Whare Wānanga o Otāgo NEW ZEALAND

NZCER Rangahau Mātauranga o Aotearoa

Students' attitude to social studies and confidence in social studies

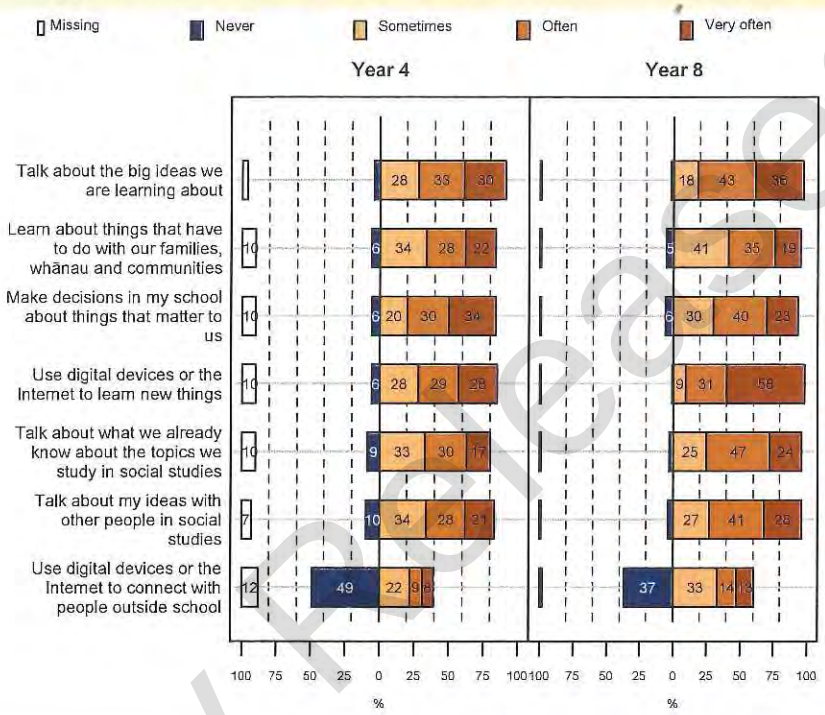
- Most students were positive and confident about learning social studies.
- Year 4 students were more positive and more confident than Year 8 students.

Opportunities to learn social studies at school

Students indicated how often they were involved in a range of opportunities to learn social studies at school (see figure right).

- For the majority of students in Year 8, most activities happened 'often' or 'very often'.
- Opportunities to 'use digital devices or the Internet to connect with people outside school' were notably fewer than other opportunities.

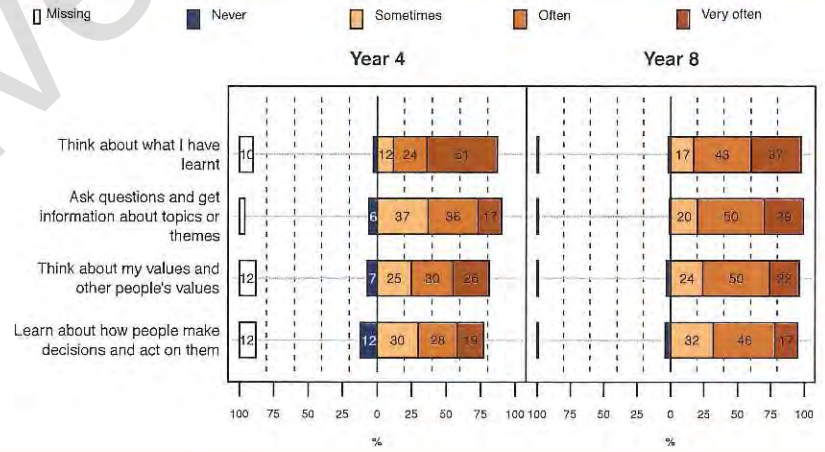
Opportunities for Year 4 and Year 8 students to learn in social studies



Opportunities to use social inquiry in social studies

- The majority of students used social inquiry in social studies at least sometimes (see figure right).
- Students most often reported 'Think[ing] about what [they] have learnt'.

Opportunities for students to use social inquiry in social studies



Teachers' and principals' perspectives on social studies

- Most teachers enjoyed teaching social studies, were confident about teaching it, and confident about teaching students to use a social inquiry approach.
- Three quarters of teachers used *Social Studies Online* on TKI to support their teaching of social studies.
- Most teachers had professional interactions with colleagues about teaching social studies at least twice a year, but only a few of them had observed a colleague teaching social studies.
- More principals at Year 8 than Year 4 indicated that teachers had access to PLD in social studies.

Communications Plan

24 October, 2019

Findings from the 2018 National Monitoring Study of Student Achievement– Wānangatia Te Putanga Tauira (NMSSA) reports for mathematics and statisti s and social studies

Situation

The University of Otago researches student achievement, involving 100 ra domly selected schools for each of year 4 and year 8, and publishes NMMSA reports for the Min stry of Education. Part of this work is commissioned to NZCER.

The 2018 findings for maths and statistics, and social s udies how some statistically significant improvements. However the historical gap in achievemen against expectations continues for year 8 compared to year 4.

A briefing is being prepared for the Minister of Educa ion, with reports on the results to be uploaded on Education Counts and the NMSSA websi e on 4 November, 2109.

Information leaflets will be inserted in the Ed cati n Gazette to inform school leaders and other readers of the findings, and draw their a tention to the fuller reports.

Context

The NMSSA assesses th strengths and weaknesses across the New Zealand curriculum over a several-year cycle, and pays spec fic attention to the achievement and progress of priority learners – Māori, Pacific, and students ith specific education needs.

There were significant ncrea es in the proportions of students achieving at the expected levels and the average scores or year 4 social studies and year 8 maths since the last time these learning areas were assessed.

In maths, significa t increases in score were seen for year 4 boys, year 8 boys, year 8 girls, year 8 Pacific students and year 8 students in low decile schools, compared to the last findings in 2013.

In so ial studies, the average achievement score significantly increased between 2014 and 2018 for ye r 4 s udents. Significant increases were also seen for year 4 girls, year 4 Māori students, year 4 Pacific students, year 4 Asian students, and year 4 and year 8 students from low decile schools.

Though the trend continues that fewer year 8 students achieve at curriculum expectations, compared to year 4, the results show that teacher confidence is high across-the-board.

Some of the broad factors that may contribute to variable achievement between year levels, subjects, and school deciles or areas include:

- NMSSA testing happens in term three and it is likely that more students would be at the expected level at the end of term four.
- Local curriculum design by schools is variable; and work is underway to create awareness about the need to strengthen it, against the intended aspirations of the national curriculum.
- Expectations of different learning areas in the curriculum may be too easy at level 2 (year 4), and/or too difficult at level 4 (year 8).
- New Zealand is less likely to have teachers with training in specialised subjects, such as maths, at these year groups, than the international average.
- The report shows us that teacher confidence is high when it comes to teaching maths and social studies. But with fewer year 8 students achieving at curriculum expectations compared to year 4, this suggests teachers may think they have a better un rstanding of what high impact practices to support learning and learner progress looks ike than they actually do.

Findings

Maths and Statistics

- Most year 4 students, 81%, achieved at or above curric lum expectations, compared to 45% at year 8.
- Boys scored higher, on average than girls, while non Māori students and non-Pacific students scored higher than Māori and Pacific students respectively.
- Students from higher decile schools scored higher, on average, that those from mid-decile schools, who scored higher than thos from low decile schools.
- The 2018 achievement in year 8 wa higher than in 2013, by the equivalent of about half a year's progress, while there was littl change for year 4 students.
- Statistically significant increases w re seen for year 4 boys, year 8 boys, year 8 girls, year 8 Pacific students, and yea 8 students in low decile schools.

Social studies

- Most year 4 students, 73%, achieved at or above expectations, while 37 % did so at year 8.
- Girls scored ighe on average than boys, at both year levels, while non-Māori students and non-Pac fic stu ents scored higher than Māori and Pacific students respectively.
- Studen s fr m higher decile schools scored higher, on average, than those from mid-decile s hools, who scored higher than those from low decile schools.
- Average achievement in year 4 was higher than in 2014, by the equivalent of around half a year's progress, but there was no change in the overall average scores for year 8 students.
- Statistically significant increases were recorded for year 4 girls, year 4 Māori and Pacific and Asian students, and year 8 students in low decile schools.

Activity plan

Activity	When	Who's responsible
Reports loaded on Education Counts and NMSSA websites	**4 November TBC**	**EDK**
Reactive responses to media	**Ongoing after the release of the reports on 30 November**	**Ministry media team.**
Leaflets in the Education Gazette outline results to schools	**February, 2020**	**Otago University/ Ministry's chann ls team**
Insights reports	**First term, 2020**	**ELSA**

Key messages (and background information for potential media responses)

Raising awareness about the results

- These NMSSA results are being communicated t schools ough a variety of channels – including leaflets in the Education Gazette, and the Schools Bulletin.
-

Student Progress and Achievement

- For the education system to be responsive, we need robust information about student progress. NMSSA is designed to get broad pic ure of student achievement across the NZ Curriculum at the primary level.
- We know that across the coun ry, st dents are experiencing rich and engaging learning that supports them to take part nd contribute fully as confident and competent citizens. We want this to happen for ll our children and young people.
- The latest NMSSA rep rt shows we still have work to do to achieve that goal.
- Information ab ut pro ress and achievement is important for students, teachers, families and whānau and the Government to make policy changes.
- Teachers can then understand the rate at which their students are learning and use the in orma on to personalise learning.
- Par nts and whānau can focus on their child's progress and support them with their next learning steps. And governments can make better decisions about where resources should go and how policies should be shaped.
- As part of the wider Education Work Programme, the Government has set up a programme of work to focus on progress and achievement across the curriculum.
- This Curriculum, Progress and Achievement (CPA) work is being progressed collaboratively with teachers and leaders, Māori and Pacific, students and their whānau in both Māori and

English medium contexts - building on what we have heard through the Education Conversation|Kōrero Mātauranga over the last 18 months.

The CPA programme includes developing:

- a process to update our national curriculum - to make sure it's fit for purpose, and reflects our aspirations for all children and young people
- resources that make it easier to recognise and respond to each student's progress
- a common approach to holistic records of learning that travel with students throughout their learning journey – so that they, their parents, whānau and teacher can see, understand and support their progress
- And, creating a trusted environment for using information about student progres hat benefits the learning of all children and young people.

- The Ministry is working with the sector to ensure that the CPA changes are imp emented in a way that is manageable, and that any workload pressures are well mitigated. These CPA changes will have a long term positive impact for all students.

Designing local curriculum

- Meanwhile we are also encouraging individual principals and schoo leaders to place a stronger focus on progress and achievement across all sub ects and areas of the curriculum. This includes strengthening their local (school) curricu m in line w th the direction of *The NZ Curriculum*.
- In our devolved system, schools and kura make c iti al choices when designing their school curriculum and marau ā-kura (local curriculum) over hat is taught from our highly flexible National Curriculum framework.
- Schools also decide how their local urric lum s taught, and when, as well as how, learning is described and reported.
- Flexibility at the local level is necessary and important. It is valued by the sector because it supports innovation. It creates th cond tions for learning to be tailored by schools and kura to meet the needs and aspirations of whānau, communities, local hapū and iwi.
- However, high flexibility can be challenging for schools and kura, because they are required to take on the main r sponsibility for curriculum decisions at a local level.
- There is a cha ce that important learning may be missed when trying to balance competing demands to de ver teaching and learning while also leading collaborative local curriculum design. This eans that ākonga experiences of school can be inequitable and inconsistent.
- We are wo king to make the competencies, knowledge and skills of learning in the National Curriculum more explicit.
- As part of the CPA work programme, we are establishing a process for updating *Te Marautanga o Aotearoa* and *The New Zealand Curriculum* so that the curricula are clear.
- By better guiding school curriculum and marau ā-kura decisions at a national level, we can provide a safety net to ensure that all ākonga have access to learning across the curriculum, and can progress and achieve.

High impact teaching practices and approaches

- We want to ensure that all students experience quality teaching in the classroom. Teachers need to be able to recognise and respond to each learner's progress. It is through the delivery of high quality teaching and learning, supported by effective, targeted PLD and resources, that we will ensure most children and young people get the tailored learning they need to progress and achieve.
- There are a range of high impact teaching practices that evidence tells us have a consistently positive impact on student learning. For example, some factors, that enable students to learn best, include when teachers:
    - create a supportive learning environment
    - encourage students to reflect on their work
    - facilitate shared learning
    - enable new learning to be connected to prior learning and experiences
    - are purposeful about assessment
    - are supported by leadership to sustain their high impact practices.
- The NMSSA findings tell us that around one in six students ne er alked to their teachers about how they are doing, or their next learning st ps in mat s And only a third of students reported that they were given feedback from th r teachers on how well they were doing in social students 'often' or 'very often'.
- We know that effective assessment should involve st dents – that by discussing, clarifying and reflecting on their goals, strategies and progress with their teachers (and parents and one another), students can develop the capac ty for self-assessment, which leads to increased self-direction.
- Effective assessment clarifies for students what they know and can do, and what they still need to learn. When students see that they are making progress and can plan their own learning goal. This means they r mo e motivated and confident.

Teacher confidence and PLD

- Effective teaching is the greatest influence on student learning and achievement. Therefore teachers, like their stude ts, need opportunities to deepen their understandings and refine their skills thro gh **qu lity professional learning and development**.
- We're e cou aging principals and school leaders to take advantage of the PLD opportunities that are fu ded and available.
- T acher need to keep abreast of current evidence about how best to meet the learning ne ds o their students.
- Understanding progress and achievement as students move along their education pathway is critical for teaching and learning. Knowing what progress looks like, what to do next in response to data, and how to differentiate instruction and accelerate learning, are crucial if all learners are to be successful.
- The latest NMSSA findings show us that teacher confidence is high. The majority of teachers were confident in, and enjoy, teaching maths. Likewise, almost all teachers were positive about social studies and most were confident teaching it.

- Teachers unanimously agreed that they knew which level of the curriculum their students were at and almost all agreed that they could confidently assess students' progress and achievement in maths. However, NMSSA tells us that, again, significantly fewer students are achieving curriculum expectations at year 8, compared with year 4.
- This suggests that teachers may think they have a better understanding of progress, achievement, curriculum expectations - and what progress looks like - than they actually do.
- The **reset of national PLD priorities** should help address this. The focus is now on critical teacher capabilities and learning across the curriculum.
- Findings show that two-thirds of teachers had participated in PLD associated with maths n the last two years, down from 80% in 2013. Half the teachers had received PLD n s cia studies within the last five years. Only a third rated the professional support they received as good or very good, with most rating it as 'fair' or 'poor'.
- Two-thirds of year 4 principals and half of year 8 principals reported that t ac ers had no or little access to professional learning and development in socia studies
- PLD was restructured in 2016 to allow for schools, kura and Kāhui Ako to apply for tailored PLD to meet the specific education challenges facing them and their students. In 2013, there were a finite number of PLD programmes schools c u d recei e (maths was part of this but we don't know how many options there were). The increased s ope of possibilities for PLD may have allowed a larger number of schools to eek PLD other areas.
- Our data indicates that an average allocation of PLD ours since 2016 amounts to a greater amount of funding than an allocation pre-2016, but we can't be sure of this. This would indicate that while a lesser number of teacher have participated in PLD, each individual who has participated has done so in g eater o ume.
- **Maths** – we can count the individual llocations f PLD hours which indicated that maths/pāngarau was a priority a ea for he PLD (sometimes it is the only priority but sometimes there are multiple)
    - 2016/17 – unreliable data
    - 2017/18 – 693 al ocat ons
    - 2018/19 – 829 allo ations
    - 2019/20 – we have only had 1 round of allocations (out of 4 for the year) but it has 219 allocations
- **Social Studies** – since the restructure of PLD in late 2016, Social Studies has not been a locally-focused PLD priority, so applicants cannot name it as a focus. There has also been no nationally focussed PLD in SS.
- We have been unable to draw system-wide conclusions from the evaluative material we have to date about the impact of PLD post-2016.
- The new PLD learning system (go live in term 1 2020) will record more useful data, which will help us understand the impact of PLD.

Tools to measure progress and achievement

- We have a range of tools, both existing and in development, to support leaders and teachers understand and measure student progress.
- We're working together with schools and kura, students, parents, whānau, iwi and communities to develop resources that map progress across the National Curriculum (*Te Marautanga o Aotearoa* and *The New Zealand Curriculum*). The resources will help teachers to recognise and respond to each student's progress across a broader range of learning – including literacy and numeracy, pāngarau and te reo matatini, as well as social and emotional learning.
- To support leaders and teachers to understand and measure student progress, the Min stry has developed the Progress and Consistency Tool (PaCT), which is underpinned by the Learning Progression Frameworks (LPF) for reading, writing and mathematics. Th LPF illustrate the significant steps that learners take as they develop their expert se n re ding, writing and mathematics from years 1 to 10, spanning levels 1 to 5 of The NZC. he PaCT helps teachers make dependable judgments about students' achievem nt th t can be used to track progress in reading, writing, and mathematics.
- These curriculum progress tools can help schools make the shift. This is why we are encouraging as many schools and kura as possible to explo e a d use the tools.
- We have simplified the website and the guidance and provi ed a ange of supports for schools and kura to investigate and implement the prog ess tools. There are self-led and peer-to-peer support options, through to centrally funded PLD and ongoing support once the tools have been implemented.

What we're doing to support teaching and learning in mathematics and statistics

Foundational Learning 'System Shift'

- We know that currently, not a le ners are getting the opportunity to experience the education they deserve. We know that we need to adapt and make some important changes. We're thinking ab ut what's critical for every learner as they develop and grow.
- Foundational learning skills and knowledge, which include literacy and numeracy as well as social and emotional learning, are as important as ever. We know that too many young people are lea ing sc ool without the key skills they need to live, work and thrive.
- We are looking at how we can support foundational learning development for children and young people i tentionally and collectively across the learning pathway. This shift in thinking will positive y benefit learners now, and in the future. In this way, the education system will s pport f ture economic growth of New Zealand, and the ongoing wellbeing of our nation's citizens

Quality teaching

- We want to ensure that all students experience quality teaching in the classroom. Teachers need to be able to recognise and respond to each learner's progress. It is through the delivery of high quality teaching and learning, supported by effective, targeted PLD that will ensure most children and young people get the learning they need to progress and achieve.
- There are a range of high impact teaching practices, such as assessment for learning, that evidence tells us have a consistently positive impact on student learning, and we know that students learn best when teachers utilise these.
- To supplement effective classroom teaching, we have a range of programmes aimed at students most at risk of not achieving, to accelerate progress and lift achievement

E-ako Maths

E-ako maths is an online resource created to support students' development of a so nd knowledge and understanding of important maths ideas from levels 1-5 of the NZC. E-ako maths is designed to complement and support a classroom teaching programme and is no inte ded to be a stand-alone tool for teaching these important concepts. Students can explore th activities and interactive modules at their own pace.

Programmes for Students

One way that the Ministry is contributing to improved out omes for a l learners is through Programmes for Students (PfS). Programmes for Students PfS) are a suite of supplementary supports for primary students, and include Accelerating Learning in Mathematics (ALiM) and Mathematics Support Teacher (MST). These are de igned to address underachievement in mathematics.

Accelerating Learning in Mathematics (ALiM)

- ALiM supports schools to work with small groups of students who are below the standard expected for their age.
- A school receives funding to free p one or two teachers with existing expertise in mathematics, to provide ddit onal help to a group of 6 to 8 students, once a day, over a 15-week timeframe
- While working with the s udents, the teacher(s) will examine which teaching methods are most effective fo accelerating students' achievement, and will also inquire into doing something d fferently to accelerate progress.
- A mentor is p ovided to support the school's leaders and the teachers throughout, and time is set aside for planning, self-evaluation and feedback.

Mathem tics Support Teachers (MST)

MST s pports schools and teachers to work with small groups of students who are well below the standard in mathematics expected for their age.

- A school releases a teacher from a large portion of their usual classroom teaching to work with groups of 6 to 8 students, who'll receive additional support once a day for 15 to 20 weeks.
- The school is funded for a year, allowing the teacher to evaluate the effectiveness of current practices that support accelerated mathematics learning with several groups of students during that period.
- The teacher also studies a relevant post-graduate paper to enhance their knowledge and skills in this area.

Census at School

The Ministry of Education partners with Stats NZ as a way of providing teachers and students with access to real and relevant multivariate data to enhance statistical learning across the curriculum. The CensusAtSchool website also provides teachers a number of curricular resources that can be used to enhance statistics learning within the classroom programme.

Other supports and resources

The Ministry further supports teaching and learning in Mathematics and Statistics via the *The N w Zealand Curriculum* Online. NZMaths also provides curriculum information, tools and resources and useful links to support the teaching and learning of Mathematics and Statistics in years 1–10.

Networks of Expertise

- The Minister's Curriculum, Progress and Achievement Advisory Group to d us that teachers and school leaders need to be well supported through clear sy tem eaders ip, strong networks and better access to resources, guidance and development opp rtunities.
- To effectively spread capability in the sector, the Ministry also funds Networks of Expertise, or NEX. NEX are curriculum, teaching and learning ne works un by teachers for teachers. NEX support subject associations across **all learning a eas**, and broader networks used by teachers and school leaders, to support and improve heir t ching practice.
- This initiative has been very strongly taken up by mat ematics teachers in New Zealand. Networks of Expertise in mathematics help to facilitate the sharing of discipline-specific and pedagogical content knowledge across the learning pathway, building capability 'by teachers, for teachers'. Feedback from the NEX initiative is telling us that primary and secondary teachers are benefiting from the recip ocal sharing of both pedagogical knowledge and subject expertise. The Ministry spends $1.3 million investing in mathematics Networks of Expertise. In 2019, seven regional mathematics teachers' associations around the country received funding, as well as the wider New Zealand Association of Mathematics Teachers.

What we're doing to supp rt te ching and learning in social sciences

The Ministry of Educat on is committed to ensuring students have the best opportunities to become critical, active and info med c tizens.

This year, we have be n supporting teaching and learning in Social Sciences by beginning the process of implementing a wide range of initiatives, changes and improvements that we know are important to ou young people.

New Zealand's histories

- Most significantly, we have heard calls through the Education Conversation | Korero Matuaranga, and wider public discussion, to ensure that all students learn New Zealand's histories. This includes Te Tiriti o Waitangi, colonisation, the Land Wars and waves of migration.
- The changes to the curriculum will be developed by the Ministry collaboratively with experts, Māori, Pacific and ethnic communities, the sector, students, parents and whānau, and other groups with a strong interest in shaping how New Zealand's histories are taught.

Pūtātara

- New Zealand's young people have also told us that they care about the planet; our oceans, rivers and cultural heritage. We have responded to this by developing resources focused on climate change, sustainability, global citizenship, and personal and environmental wellbeing.
- Earlier this year, we developed a new curriculum resource for years 7-10 – *Pūtātara: A Call to Action* for schools and teachers. Pūtātara is a new and exciting resource that promotes sustainability and global citizenship through inquiry learning using Tūrangawaewae, Kaitiakitanga and Whakapuāwai as pou arahi. Pūtātara provides tools for schools, teachers and ākonga to engage with sustainability and global citizenship in their own settings.

Climate change: Prepare today, live well tomorrow - Teacher resource and wellbeing guide

- We are currently finalising a new curriculum resource, *Climate Change Prepare today, live well tomorrow* that will support schools and teachers to increase aw ren ss of climate change and helps students understand how it impacts on them n a cal, national and global scale.
- This is a (curriculum) level four (Years 7-8) learning programme that aims to:
    - Increase awareness of climate change and explain the role science plays in understanding it
    - Understand both the response to and impacts of climate change; globally, nationally and locally
    - Explore & act on opportunitie to contribute to reducing and adapting to the impact of climate change on everyday life

Racism Toolkit #notinmyworld

- Another pressing concern for many tudents is racism, especially after the recent tragic events in Christchurch. In the wake of the Christchurch terrorist attack, schools and teachers were looking for more s pport from the Ministry on how to engage in conversations with their students about topics such as racism, diversity and empathy.
- The #notparto myworld toolkit targets Years 3-8 students, and combines elements from the Social Science nd English learning areas of The NZC. The kit contains a range of tasks that will help t achers and students co-create a classroom commitment around valuing diversity, buildi g empathy and moving towards the goal of making racism #notpa tofmyworld.

Tuia 50

- 2019 marks the 'sestercentennial' (250th anniversary) of the first meetings between Māori and Europeans following the arrival of James Cook and the *Endeavour* at Tūranga (Gisborne). We have created a section on NZHistory, Encounters, to provide resources and information to support understanding of early voyaging and encounter history in New Zealand. Here, teachers and students can discover stories of encounter between two great voyaging traditions – Te Moana-nui-ā-Kiwa (Pacific).

- Students are encouraged to consider exactly *what* and *who* we are commemorating. Is this, as in 1969, a celebration, an attempt to provide a unifying experience engendering a sense of shared identity or pride? Or is it a protest against an 'invasion' and colonisation? Maybe it is something more complex and nuanced that sits between these two viewpoints. During 2019, new material will continue to appear on this site to support those exploring this theme.

Other supports and resources

The Ministry further supports teaching and learning in Social Sciences via the social science page of the *The New Zealand Curriculum* Online. The social studies area of Social Sciences Online also provides curriculum information, tools and resources, and useful links to support the teaching and learning of social studies in years 1–10.

Reactive questions and answers

What changes are being made in assessing student progress and achievement?

In April 2018, the Minister set up a Curriculum, Progress and Achievement (M nisterial) Advisory Group to provide advice on how to:

- ensure our National Curriculum (*The NZC* and *Te Marau ang o Aotearoa*) are fit for purpose, and schools and kura find them easy to use in their local contexts
- provide greater visibility to parents, students and thei teachers about what growth and progress looks like across all areas of the curri ulum.

- We are getting work under way to make the competencies, knowledge and skills of learning in the National Curriculum more explicit.

- We are working in collaboration with teachers and eaders, Māori, Pacific, students, parents and whānau to:
  - develop a process for updatin our na ional curriculum to make sure it's fit for purpose, and reflects our aspirations for ll chi dren and young people
  - develop resources that make it easier to recognise and respond to each student's progress
  - develop a common approach to holistic records of learning that travel with students throughout their learning j urney – so that they, their parents, whānau and teachers can see, underst nd and support their progress
  - create a trus ed env ronment for using information about student progress that benefits all children and yo ng people's learning.

Why are teacher confident when the student achievement is below expectations?

Teachers unanimously agreed in the NMSSA findings that they knew which level of the curriculum their tudents were at and almost all agreed that they could confidently assess students' progress a d a hievement in maths.

These findings suggest that teachers may think they have a better understanding of progress, achievement, curriculum expectations, and what progress looks like, than they actually do.

Quality teaching is identified as a key influence on high quality outcomes for diverse students, and we know that there are a range of high impact teaching practices that have a consistently positive impact on student learning.

We’re encouraging principals and school leaders to ensure their teachers take part in the Professional Learning and Development (PLD) opportunities that are available.

We know, also, that effective, purposeful assessment, that involves students, has a positive impact on student learning. Effective assessment enables students to discuss, clarify and reflect on their goals and progress. It provides them with an understanding of what they know and can do, as well as what they still need to learn. Findings from NMSSA show that this isn’t happening for all students (around 1 in 6 students said they never talked to their teacher about how they are doing, or the next learning steps in maths; only a third of students said they were given feedback from their teache on how well they were doing in social students ‘often’ or ‘very often’).

Our reset of national Professional Learning and Development priorities should help improve teaching and assessment practice. The focus is now on critical teacher capabilities and l ning across the curriculum. The reset, which includes assessment for learning, is designed o bette support improvements in school-wide curriculum implementation.

The new PLD learning system (go live in term 1 2020) will record more useful da a wh ch will allow us to draw substantiated conclusions.

Why are the results in year eight so low in both Maths and Social Studies in comparison to year four?

The purpose of this periodic NMSSA monitoring is to draw out ends lik these – so we can increase awareness among schools leaders and principals as here there are improvements or declines in student progress and achievement in these pri ary years.

These results highlight the need to strengthen the d sign of local curriculum to ensure students experience rich learning that reflects the depth and b eadth of the New Zealand Curriculum at all year levels.

Additional reasons may be:

- Expectations of different lea ning areas in the curriculum may be too easy at level 2 (year 4), and/or too difficult at /leve 4 (year 8).
- New Zealand is less ikely to have teachers with training in specialised subjects such as maths at these year groups, than the international average.
- NMSSA testing happens in term 3, and it is possible that more students would be at the expected level at the end of term 4. NMSSA takes place in term 3 so as not to overburden schools, who have shorter term and more commitments in term 4

It’s worth noting that the year 8 results are not consistent with the maths outcomes we see for older students n 2018, 79% of students achieved NCEA Level 2 or above and of those, 44% of students attained evel 2 or above for Maths and Statistics. The definition of attainment is gaining 14 or more credits for he learning area where the result is Achieved, Merit or Excellence.

What support is in place to life achievement in mathematics and social studies?

We want to ensure that all students experience quality teaching in the classroom. Teachers need to be able to recognise and respond to each learner’s progress. It is through the delivery of high quality teaching and learning, supported by effective, targeted PLD that will ensure most children and young people get the learning they need to progress and achieve.

To supplement effective classroom teaching, we have a range of programmes aimed at students most at risk of not achieving, to accelerate progress and lift achievement in maths:

- Foundational learning 'system shift'
- E-Ako Maths
- Programmes for Students (ALiM and MST)
- Census at School
- TKI teaching and learning resources

We have a range of initiatives in place to support teaching and learning in Social Studies:

- Updating the National Curriculum to make teaching and learning of New Zealand's histories an explicit expectation so that it will be taught in all schools and kura by 2022.
- Pūtātara
- Climate Change curriculum resource
- Racism toolkit
- Tuia 250
- TKI teaching and learning resources

We know there is a lack of clarity in our National Curriculum about which outcomes are most important. We're developing a process for updating our National Curricu um to make sure it's fit for purpose, and to ensure that the important learning isn't left t chance Work is already under way to make the competencies, knowledge and skills of learning in the National Curriculum more explicit.

We're also working together with schools and kura, student parents, whānau, iwi and communities to develop resources that map progress across the National Curriculum (*Te Marautanga o Aotearoa* and *The New Zealand Curriculum*). The resources w l help teachers to recognise and respond to each student's progress across a broader range f learning – including literacy and numeracy, pāngarau and te reo matatini, as well as social and em tional learning.

To support leaders and teachers to und r tand and measure student progress, the Ministry has developed the curriculum progress tools. These tools help teachers understand, and then track, progress in literacy and numeracy The illustrations show students using their reading and writing knowledge and skills in authent c, purposeful learning tasks across the curriculum. In the mathematics framework, the focu is on students using their knowledge and skills to solve mathematical problems In reading and writing, the focus is on how students use their reading and writing to learn in ***all*** learning areas and key competencies. These tools can help schools make the shift.

Why are Māori a d Pacific students scoring lower than non-Māori/Pacific students in both mathem tics and social studies in both year levels?

W kn w there is significant variability in the quality of curriculum, teaching and learning across the education system. This has had a differential impact on different groups of leaners, and in particular has meant that the needs of Māori, Pacific, disabled, and those with learning needs have not been well met, impacting on student wellbeing, engagement, progress and achievement. Too many learners and their whānau tell us they do not belong in our education system.

We also know that racism and bias inherent in our system continue to impact Māori and Pacific learner confidence, achievement, and outcomes. Other factors include negative bias in teacher

judgements, low expectations of Māori and Pacific learners, devaluing mātauranga Māori, te ao Māori and Pacific cultures, and poor knowledge of and access to te reo Māori and Pacific languages.

What is being done/what are the plans to help bridge the gap between Māori success and non-Māori students?

Māori education has been a strong focus of the Kōrero Matauranga. Feedback from the korero told us that Māori people want to exercise tino rangatiratanga – agency and authority – over the education of Māori learners. This means there needs to be a genuine partnership approach acro s the education system, with leaders who believe in Māori and understand te ao Māori. Th s is vital to Māori education success. This will look different in different settings, but the underlying aim of Māori agency and authority is constant.

Teaching and learning should be culturally responsive, individualised localised relevant, flexible and future-focused. Māori seek to develop skills, knowledge and experi nce to support their participation in te ao Māori and New Zealand society.

Sense of belonging is crucial for Māori to succeed as Māo i. The ed cation system needs to better reflect and foster Māori identity, culture and values in all their d versity.

To address some of these issues, we have recently re-started Te Kotahitanga. Now known as **Te Hurihanganui**, this is a Wellbeing Budget 2019 initiative. It supports educational achievement for Māori learners by testing out what works to address cultural bias and racism in the education system.

- Te Hurihanganui is based on six k y design principles:
  - Te Ao Māori – valuing Māor kn wledge
  - Tino Rangatiratanga – acknowledging and supporting Māori agency and authority
  - Whanaungatanga – upportin authentic relationships
  - Te Ira Tangata – uilding critical awareness of privilege and power
  - Mana Ōrite – equal elationships and mana
  - Te Hāngaitanga – collective responsibility for success

Te Hurihanganui isn t just for schools. It acknowledges that parents, whānau, hapū, iwi and communities are c itical in supporting Māori learner success. Te Hurihanganui will work with schools and comm ities at the same time to help them build powerful partnerships to support learner outcomes.

Ou curriculum progress tools also help by providing teachers with greater clarity about what to n tice when observing and interacting with students. They can track students' and class progress, and use the data to inform teaching programmes and guide decisions about how to improve students' learning.

What is being done/what are the plans to help bridge the gap between Pacific success and non-Pacific students?

Pacific education was also a strong focus of the Kōrero Matauranga. We heard that the education system needs to acknowledge and value Pacific cultures, identities and languages, and learner and family wellbeing. We heard that, for Pacific people, success is about the collective, and that a child's success is the success of the family.

This feedback is now shaping our future education system. It is adding a Pacific voice to many pa t of our work programme. It is also shaping a new plan for Pacific education.

We have developed Tapasā, which is a cultural competencies framework for teachers of Pacific learners. Tapasā is a tool that has been designed to support teachers to become more ulturally aware, confident and competent when engaging with Pacific learners, and their parents, amilies and communities. It aims to contextualise quality teaching and planning within a Pac fic earner setting by providing a Pacific lens to the Standards for the Teaching Profes ion an the *Code of Professional Responsibility*.

Later this year we'll be re-engaging with our Pacific communities to check we're on the right path with our thinking and to design the next plan in discussion with he education sector and communities. We know we can't do this alone. To see system that responds to and values the diverse identities, languages and cultures that make up o r acific communities, we need to work collectively and build on the innovation and resilience of our Pacific communities in Aotearoa.

In the interim, our existing Pasifika Education Pl n wil remain in place until the end of 2019.

Our curriculum progress tools also help by p oviding teachers with greater clarity about what to notice when observing and interacting w th students. They can track students' and class progress, and use the data to inform teaching p ogrammes and guide decisions about how to improve students' learning.

Te Hurihanganui: Although Te Hurihanganui was designed for and by Māori, to help support educational achievem nt for Mā ri learners, its focus is on testing out what works to address cultural bias and racism in th education system. We expect that the findings will help address the cultural bias and rac sm that Pacific learners and their families also experience in the education system.

Why is there a onsistent gap between students in low and high decile schools – the equivalen of about two year's progress in both mathematics and statistics and social studies?

Deciles are a measure of the socio-economic position of a school's student community relative to o her schools throughout the country. For example, 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. We know that excellence and under-performance exist in individual schools in both high and low deciles.

There are many factors that influence educational achievement, and while social circumstances have an impact, so does effective teaching. Whānau and community have a significant influence on student learning but quality teaching is considered to be the biggest 'in-school' influence on student learning. It is one of the most important aspects for achieving high quality student outcomes for diverse students.

There are a range of high impact teaching practices that evidence tells us have a consistently positive impact on student learning. For example, the NMSSA findings tell us that around 1 in 6 students never talked to their teachers about how they are doing, or their next learning steps in maths. And only a third of students reported that they were given feedback from their tea hers on how well they were doing in social students 'often' or 'very often'.

One of the ways we're creating the conditions for a system focused on equity and excell nce is by ensuring that PLD supports schools, kura and Kāhui Ako to address locally-identified school-wide factors that will improve curriculum, teaching and learning for all ākonga. Given t at u lity teaching has the greatest in-school impact on student outcomes, we are re-sett ng the natio al PLD priorities so that they focus on critical teacher capabilities and learning across the curri ulum.

We also know that actively building strong relationships and relational t ust between teacher-student-family and whānau, for a strong home-school partners ip, s critical for success.

Our curriculum progress tools also help by providing tea her with g eater clarity about what to notice when observing and interacting with students. They an track students' and class progress, and use the data to inform teaching programmes and guide d cisions about how to improve students' learning.

Why are boys achieving lower results in yea eight social studies than girls (by 10 NSS points) – equivalent to a year's progress?

In recent years, increased attention has been given to boys' education due to the relative gap between the achievement of girls and boys. Evidence shows that key education issues for boys include: early problems in r ading lower achievement in reading and writing; disengagement with school; and lower qualification attai ment. The difference in achievement between girls and boys isn't specific to New Z aland; it can be observed across the globe.

The reasons for the d fference girls' and boys' achievement are complex and there are a wide range of factors that may impact on the outcomes of boys in schools. As such, there are no 'separate' programmes d rect d to boys, or teachers of boys. However, we aim to ensure all students achieve the skills hey need by providing a flexible and responsive education in culturally responsive schools. This includes ensuring every student experiences opportunities to learn and progress th ough a curriculum that values their identity, language and culture, their strengths and aspirations, and those of their whānau.

ur curriculum progress tools also help by providing teachers with greater clarity about what to notice when observing and interacting with students. They can track students' and class progress, and use the data to inform teaching programmes and guide decisions about how to improve students' learning.

Why are social studies and mathematics and statistics being looked at this year?

Each of the eight Learning Areas of The NZC is measured once during each five year cycle of NMSSA, with one or two learning areas measured each year. The NMSSA steering group decide which learning areas will be part of the study each year, and plan this in advance, with room to change things if necessary.

Scheduling is dependent on having the space to fully assess each learning area, how long it has been since the learning area was last measured, and any government priorities and recent curriculum changes that focus on particular learning areas. Student experience is also an imp rtant consideration when thinking about the combination of learning areas. Contrasting areas of the curriculum are assessed together so that students experience a variety of assessment appr ac es.

Mathematics and statistics was last measured five years ago (2013), and social studies was measured four years ago (2014), enabling the 2018 assessment to investigate c anges in student achievement since the learning areas were last assessed.

Why does the Ministry of Education / NMSSA not currently look at ach subject every year – rather than two subjects each year?

NMSSA provides a unique picture of student achievemen across The NZC over time. Each learning area is measured as part of a five yearly cycle. Th s allows for the examination of system-level progress over time.

It gives us a chance to assess each area in d pth, u ing interview and group tasks, rather than traditional pen and paper survey tasks, which ar not su table for learning areas such as the arts and physical education. Assessing two earning areas each year allows us to look at any changes to student achievement that have taken place over time. It provides useful information that can speak to the efficacy of any policy or progr mes that have been introduced since the previous cycle.

It also allows the collection of contextual factors which assist in the understanding of student achievement in each l arning area. Students, teachers and principals respond to questions about the school environmen and how the subject is taught, while teachers' and students' attitudes towards and con ide ce i the subject are also measured.

Why does the dat collecting by NMSSA happen in term 3, when the expected results of the curriculum leve are at the end of term 4?

Schools are very busy in the final term, and the term is shorter, which would make moving the NMSSA data collection into term four more of a burden on schools and decrease the likelihood that schools would be willing to participate.

There's data on students being positive and confident about learning the subjects, how was this measured?

Students who take part in NMSSA respond to contextual questionnaires, which ask questions about their attitudes and confidence in the learning areas being assessed, as well as their opportunities to learn.

Students respond to six statements about their attitude towards the subject, including how important they think learning the subject is, how much they like learning it and whether they think it is useful to learn the subject. Students can respond that they 'totally agree', 'agree quite a lot', 'agree a little' or 'do not agree at all'. Responses to the six statements are used to develop a scale. Students in the 'very positive' part of the scale 'totally agree' with most of the statements, students in the 'positive' section mainly 'agree a lot' or 'agree a little' and the 'not positive' part of the scale is associated with students mainly saying they 'do not agree at all'.

Similarly, a confidence scale is developed using four statements related to students' con dence in their ability in the subject, including whether they, their teachers, and their whānau think h y ar good at the subject.

What are the future plans to survey schools and collect data when the decile system is being scrapped – there seems to be a current emphasis on comparing h gh and low decile schools in the summary of results.

New Zealand's school decile system will be replaced by the Equity Index, an individual risk system, by 2022. The Equity Index will identify disadvantage acro s sc ool in New Zealand, and will be used to allocate extra funding based on the relative socioecon mic disadvantage of students who attend the school. The 25 percent of students with the la gest socioeconomic barriers are considered 'disadvantaged'. The Equity Index for each sch ol will relate to the proportion of students at that school who are disadvantaged. The Equity Index will replace the current decile system, which measures the relative socio-economic position of a school's community.

NMSSA is currently investigating whether they will se the Equity Index as a measure of school-wide socio-economic status, or develop a set o questions to ask at the student level to determine students' relative level of disadvantage. Student-l vel socio-economic status measurement would include questions about student access to esources (a computer or tablet, an internet connection, their own bedroom), their parents' ed cat on and the number of books they have at home, which can be used as a measure of rel tive wealth. Socio-economic status is currently measured at a student level by the international studie of student achievement that New Zealand students participate in (PISA/TIMSS IRLS).