

Wānangatia te Putanga Taurira
National Monitoring Study
of Student Achievement

Using Digital Technologies
for Teaching and Learning
2016 – Key Findings



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National Monitoring Study
of Student Achievement

Using Digital Technologies for Teaching and Learning 2016

Key Findings

Educational Assessment Research Unit
and
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National Monitoring Study of Student Achievement
Educational Assessment Research Unit, University of Otago, PO Box 56, Dunedin 9054, New Zealand
Tel: 64 3 479 8561 • Email: nmssa@otago.ac.nz

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2016 Project Team	EARU	NZCER
Management Team	Sharon Young Alison Gilmore Lynette Jones Jane White	Charles Darr
Design/Statistics/ Psychometrics/Reporting	Alison Gilmore Albert Liau Mustafa Asil	Charles Darr Hilary Ferral Jess Mazengarb Linda Bonne
Curriculum/Assessment	Sharon Young Jane White Cheryl Pearson	Linda Bonne Basil Keane Rose Hipkins
Programme Support	Lynette Jones Linda Jenkins James Rae Pauline Algje Lee Baker	Jess Mazengarb
External Advisors	Jeffrey Smith – University of Otago Marama Pohatu – Te Rangatahi Ltd	



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- the Ministry of Education Research Team and Steering Committee.

Executive Summary

Introduction

In 2016, the *National Monitoring Study of Student Achievement* (NMSSA) assessed student achievement at Year 4 and Year 8 in two learning areas of the *New Zealand Curriculum* (NZC) – technology and learning languages. This report provides findings on an additional area of research in 2016 – the use of digital technologies for teaching and learning. This study was added to NMSSA 2016 as it was a timely opportunity to obtain information about the use of digital technologies for teaching and learning – an emerging area of curriculum development for the Ministry of Education. As the new Digital Technologies Hangarau Matihiko curriculum had not been completed during the time of the study, the investigation was independent of the other learning areas. A section of the questionnaires administered to students, teachers and principals, asked them about the use of digital technologies for teaching and learning. Students were asked about their attitudes toward the use of digital technologies for learning, the opportunities to use digital technologies in school, and access to digital technologies at home. Teachers were asked about their attitudes to the use of digital technologies for teaching and learning, the opportunities for their students to use digital technologies in school, and their perceptions of the effects of using digital technologies for teaching and learning. Principals were asked about their perceptions of the effects of using digital technologies for teaching and learning, and the level of support for implementing digital technologies in school.

Digital technology

In the student questionnaire, the use of digital technologies was referred to as ‘learning with digital devices’. Learning with digital devices was defined as ‘using the Internet, computers, tablets, iPads, notebooks, laptops, smartphones and other digital tools as part of your learning at school’. In the teacher questionnaire, the definition of digital technology was: ‘Digital technologies include, but are not limited to, using the Internet, computers, tablets, notebooks, smartphones and other emerging digital tools as part of your teaching programme within the classroom’. In the principal questionnaire, the definition of digital technology was: ‘Digital technologies include, but are not limited to, using the Internet, computers, tablets, notebooks, smartphones and other emerging digital tools as part of teaching and learning programmes’.

Study features

NMSSA used a two-step sampling procedure to select 100 schools at each year level and up to 27 students within each school. The nationally representative sample at each year level was made up of about 2,300 students (see Appendix 1, *Technical Information 2016* report). The digital technology questionnaire was one of the sections of a computer-based questionnaire administered to all students. An Item Response Theory (IRT) measure called Attitude to Learning with Digital Devices (ALDD) was constructed from the attitude statements of the digital technology questionnaire.

Up to three teachers in each school completed a teacher questionnaire. In total, 231 Year 4 teachers and 270 Year 8 teachers responded. In total, 182 of the 200 principals completed the principal questionnaire. The digital technology questionnaire was one of the sections of pencil-and-paper questionnaires administered to teachers and principals.

Key findings about using digital technology for teaching and learning

Students' attitude to learning with digital devices

Students generally had positive to very positive attitudes towards learning with digital devices. Year 4 students generally had more positive attitudes than Year 8 students, although there was a great deal of overlap in the ALDD scale score distributions for Year 4 and Year 8. Boys had more positive attitudes, on average, than girls at both year levels. There were no differences in average ALDD scale scores between ethnic groups at either year level. On average, Year 4 students from high decile schools had more positive attitudes than students from mid decile schools. At Year 8, on average, students from high and mid decile schools were less positive than students from low decile schools. At Year 4, there were no statistically significant differences between the average ALDD scale scores for students at different types of school. At Year 8, the average ALDD scores for students at full primary schools was greater than that for students from secondary schools. This difference and the differences by year level, gender and school decile described above were generally of small effect sizes.

Students' use of digital technologies in school

At least 40 percent of students at Year 4 used digital devices 'Very often' to 'Learn about using the Internet safely', 'Search for information on the Internet', and 'Use online learning activities/games'. At Year 8, 63 percent of students used digital devices 'Very Often' to 'Search for information on the Internet'.

At both levels, boys' and girls' responses were generally similar. At Year 4, boys were more likely than girls to 'Watch an online activity that is happening in another place'. At Year 8, girls were more likely than boys to 'Create digital texts', and 'Search for information on the Internet'. The effect sizes of the gender differences were small.

The responses of students from different decile bands were similar. Generally, students from low decile schools had the most frequent opportunities to learn with digital devices, with two exceptions. At both year levels, students from high decile schools had more frequent opportunities to 'Search for information on the Internet'; at Year 8, students from high decile schools had more frequent opportunities to 'Create digital texts'.

Students' access to the Internet and digital technologies at home

The majority of students at both year levels had Internet access at home (Year 4: 81 percent, Year 8: 94 percent). At both levels, less than 6 percent did not have Internet access, and the remaining 13 percent of Year 4 students and 1 percent of Year 8 students did not know.

At both year levels, about two thirds of students reported having a desktop computer at home that they were allowed to use, and about three quarters had access to the use of a tablet/iPad. A greater proportion of Year 8 students than Year 4 reported having, and being allowed to use, a notebook/laptop (69 percent vs 47 percent) and a smartphone (77 percent vs 40 percent). With regards to school decile, availability and access at home were generally lowest for students from low decile schools.

Teachers' perspectives

At both year levels, the majority of teachers were positive about digital technology. Over 75 percent of Year 4 and Year 8 teachers responded 'Moderately true' or 'Very true' to the attitude statements. This finding was generally similar across decile bands. There were no year level or gender differences.

At both year levels, the majority of teachers reported that their students had opportunities to use digital technology. Over 50 percent of Year 4 teachers and over 40 percent of Year 8 teachers responded 'Very often' to the following opportunities: 'Search for information on the Internet', 'Use online learning activities/games', and 'Work with others on an activity using a digital device'. This finding was generally similar across decile bands.

The majority of teachers at both year levels were positive about the effects of digital technology on students' learning. Over 90 percent of teachers at both year levels, responded 'Agree' or 'Strongly agree' to the following statements: 'It has helped my students integrate knowledge from more than one learning area,' 'It has increased my students' engagement in their learning,' 'It has made me think about new ways of teaching and learning,' 'It has allowed some of my students to show knowledge and skills that were not so evident

with pen and paper'. At Year 4, over 90 percent of teachers responded 'Agree' or 'Strongly agree' to the following item: 'It has made positive changes to the way my students learn'.

Principals' perspectives

Principals at both year levels were similarly positive about the effects of using digital technologies for teaching and learning. Over 90 percent of the principals responded 'Agree' or 'Strongly agree' to all the statements. This finding was generally similar across decile bands. There were no year level differences.

Principals were also similarly positive about the level of support they had available for implementing digital technologies in schools.

1 Introduction to NMSSA

This chapter provides a broad overview of the purpose and features of national monitoring, introduces the focus of the study for 2016, and outlines the structure of the digital technology report.

1. Purpose and features of national monitoring

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

- provide a snapshot of student achievement against the NZC
- 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.

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

The study began in 2012 and has been carried out over a five-year cycle. During the first cycle, we are setting the baseline for measuring change in student achievement over time in subsequent cycles.

The study continues the monitoring undertaken by the National Education Monitoring Project (NEMP) between 1995 and 2010. It also complements information generated by international evaluation studies, such as the Trends in International Mathematics and Science Study (TIMSS), the Progress in International Reading Literacy Study (PIRLS) and the Programme for International Student Assessment (PISA).

In addition to designing and carrying out an assessment programme, NMSSA collects contextual information from students, teachers and principals to help understand the factors associated with students' achievement. This includes: students' attitudes to, and their opportunities to learn in, the specific learning area being investigated; teachers' confidence in teaching the specific learning area and the learning opportunities students are provided with in classroom programmes; teachers' and principals' views of the professional and curriculum support provided by the school and the provision in the school for the learning area.

The project is supported by advisory panels of curriculum experts¹, reference groups for the priority learner groups (Māori, Pasifika and special education needs) and a technical reference group.

¹ The technology advisory panel comprised technology discipline experts, advisors, teacher educators and researchers as well as classroom teachers and representatives of the Ministry of Education.

2. The focus of the study for 2016

The NMSSA 2016 provided a timely opportunity to obtain information about the use of digital technologies for teaching and learning – an emerging area of curriculum development for the Ministry of Education. As the new Digital Technologies Hangarau Matihiko curriculum had not been completed during the time of the study, the investigation was independent of the other learning areas². In 2016, the focus for the NMSSA study was technology³ and learning languages⁴. Nationally representative samples⁵ of about 2,300 students from 100 schools at each of Year 4 and Year 8 took part in group-administered assessments that focused on the technology and te reo Māori learning areas. Students, as well as teachers and principals, also completed questionnaires that gathered contextual information. A section of the questionnaires administered to students, teachers and principals asked them about the use of digital technologies for teaching and learning in school. Students were asked about their attitudes toward the use of digital technologies for learning in school, the use of digital technologies in school, and access to digital technologies at home. Teachers were asked about their attitudes toward the use of digital technologies for teaching and learning in school, the use of digital technologies in school, and their perception of the effects of digital technologies for teaching and learning. Principals were asked about their perception of the effects of using digital technologies for teaching and learning, and the level of support for implementing digital technologies in school.

The questionnaires were administered by experienced, specially-trained classroom teachers during Term 3 (July to September 2016).

Table A1.1 in the Appendix summarises the characteristics of the samples of students, teachers and principals from whom data was collected.

3. Structure of the digital technology report

This report provides the key findings from the 2016 NMSSA study of digital technology. The report is set out in four chapters.

- Chapter 1 provides a broad overview of the NMSSA programme.
- Chapter 2 provides an overview of the digital technology study and questionnaires. It also sets out the analytical and reporting approaches used to present the findings.
- Chapter 3 presents the findings on students' perspectives - their attitudes toward the use of digital technologies for learning, their opportunities to use digital technologies in school, and access to digital technologies at home.
- Chapter 4 presents the findings on teachers' and principals' perspectives on the use of digital technologies for teaching and learning.

The report also contains an appendix providing detailed tables of results. Other background and technical information is contained in the separate report *Technical Information 2016*⁶.

² In the next cycle of NMSSA, the new Digital Technologies Hangarau Matihiko curriculum will be taken into consideration.

³ The findings for technology can be found in *NMSSA Report 13: Technology – Key Findings*.

⁴ The findings for learning languages can be found in *NMSSA Report 12: Learning Languages – Key Findings*.

⁵ Information about the sampling process and the achieved samples can be found in Appendix 1 of *NMSSA Report 15: Technical Information 2016*.

⁶ *NMSSA Report 15: Technical Information 2016*.

2 NMSSA Digital Technology Study

This chapter provides an overview of the 2016 NMSSA using digital technologies for teaching and learning study. Henceforth, the term 'digital technology' will be used to refer to 'using digital technologies for teaching and learning.'

- Part 1 outlines the digital technology study.
- Part 2 provides an overview of the digital technology questionnaires.
- Part 3 describes the sample of the study.
- Part 4 provides information about how the findings are presented.

1. 2016 NMSSA digital technology study

The aim of the 2016 NMSSA digital technology study was to collect information on views from students, teachers and principals about the use of digital technologies for teaching and learning.

The use of digital technologies was defined similarly in each of the three questionnaires. In the student questionnaire, the use of digital technology was referred to as 'learning with digital devices'. Learning with digital devices was defined as 'using the Internet, computers, tablets, iPads, notebooks, laptops, smartphones and other digital tools as part of your learning at school'.

In the teacher questionnaire, the definition of digital technology was as follows: 'Digital technologies include, but are not limited to, using the Internet, computers, tablets, notebooks, smartphones and other emerging digital tools as part of our teaching programme within the classroom'.

In the principal questionnaire, the definition of digital technology was as follows: 'Digital technologies include, but are not limited to, using the Internet, computers, tablets, notebooks, smartphones and other emerging digital tools as part of teaching and learning programmes'.

2. Overview of the digital technology questionnaires

Component 1: Student perspectives on the use of digital technologies for learning

The digital technology questionnaire was part of a computer-based questionnaire that asked students to rate a series of statements about their attitudes towards the use of digital technologies for learning, their opportunities to use digital technologies in school, and the amount of access they had to digital technologies at home.

Attitude scale construction and reliability

IRT was used to construct a reporting scale based on students' responses to the attitude statements of the digital technology questionnaire. The scale constructed was the Attitude to Learning with Digital Devices (ALDD) scale. As with the other NMSSA scales, the attitude scale was set to have an average of 100 scale score units and an average standard deviation of 20 scale score units. For the ALDD scale, the person reliability index was 0.60 and the item reliability index was 0.99.

Component 2: Teacher and principal perspectives on digital technology

The digital technology questionnaire was part of a pencil-and-paper questionnaire that asked teachers and principals to rate a series of statements about their attitudes and use of digital technology. Teachers were asked about their attitudes about using digital technologies for teaching and learning, the opportunities for their students to use digital technologies in school, and their perception of the effects of digital technologies for teaching and learning. Principals were also asked about their perception of the effects of using digital

technologies for teaching and learning, and their perspectives on the level of support for implementing digital technologies in school. The items in the questionnaires were based on previous questionnaires developed by EARU and NZCER⁷.

3. Completion of the questionnaires

The student questionnaire

All students (2,337 at Year 4 and 2,284 at Year 8) completed a computer-based questionnaire, arranged in several sections. The digital technology questionnaire was one of the sections of the computer-based questionnaire.

The teacher questionnaire

Up to three teachers in each school completed a teacher questionnaire. In total, the study included 231 Year 4 teachers and 270 Year 8 teachers.

Table 2.1 shows the percentage of teachers responding to the questionnaire at each year level, by school decile band.

For the digital technology questionnaire, at Year 4, there were 13–17 teachers who had missing data for one or more questions. At Year 8, there were 27–36 teachers who had missing data for one or more questions. The results reported for each question did not include the missing data.

Table 2.1 Percentage of responses to the teacher questionnaire, by year level and school decile

School decile	Percentage of teachers	
	Year 4 % N = 231	Year 8 % N = 270
Low	21	20
Mid	41	39
High	38	41

The principal questionnaire

In total, the study included 182 of the 200 principals; 91 from each year level. Table 2.2 shows the percentage of principals who responded by school decile band at each year level.

Table 2.2 Percentage of principals who responded to the questionnaire, by year level and school decile

School decile	Percentage of principals	
	Year 4 % N = 91	Year 8 % N = 91
Low	20	24
Mid	44	36
High	36	40

There were one to two principals who had missing data for one or more questions. The results reported for each question did not include the missing data.

It is important to note that the teachers and principals who completed the questionnaires do not necessarily constitute nationally representative samples. The findings discussed in this report should be interpreted as a broad indication of teachers' and principals' views about digital technology.

⁷ A few items were similar to those used in the NZCER National Survey project. The most recent related findings are reported in: Bolstad, R. (2017). *Digital technologies for learning: Findings from the NZCER National Survey of primary and intermediate schools 2016*. Available at <http://www.nzcer.org.nz/research/publications/digital-technologies-learning-national-survey>.

4. Presentation of the findings

This section describes how graphs and tables are used to present findings in the report, and includes an explanation of some of the statistics used.

Box plots

Box and whisker plots (box plots) are used extensively throughout this report to summarise score distributions.

To construct a box plot, scores are ordered from low to high and then divided into four groups of equal size, called quartile groups. These are shown in Figure 2.1.

The box is used to show the range of the middle 50 percent of the scores and the whiskers the top and bottom 25 percent of scores. In this report, the whiskers of the box plot do not include outliers (scores considered to be rare and unusual) and have a maximum length of 1.5 multiplied by the inter-quartile (middle 50 percent) range.

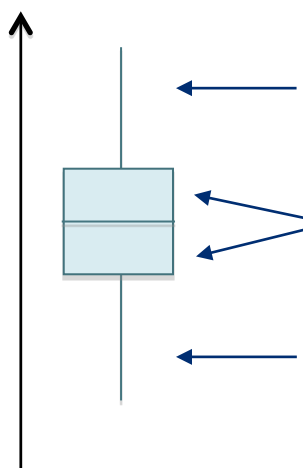


Figure 2.1 Understanding box plots

When box plots for two or more groups are presented as part of the same graphic, the widths of the boxes are used to represent the relative sizes of the groups. For instance, a narrow box indicates that the group size is smaller than that represented by a wider box in the same plot. Box plots have not been drawn when the size of the group falls below 30 students.

The colours for the box plots have been chosen to assist with readability. Different hues have been selected to represent each of the reporting groups (for instance, gender) and two different shades of each hue chosen to represent the group at each year level (a lighter shade for Year 4 and a darker shade for Year 8). The intention behind the use of shades was to show the relationships between the year levels and the different reporting group types at the same time.

Tables of numerical results

The ALDD measure developed for the NMSSA technology study quantifies attitude differences in terms of scale score units. Table 2.3 shows the differences in average scale scores on the ALDD scale between all Year 4 and Year 8 students.

Table 2.3 Difference between the average scale scores for Year 4 and Year 8 on the ALDD scores

	ALDD Score Differences
Difference in average scale score (Year 8 – Year 4)	-2
Confidence interval	(-3.5, -0.5)
Effect size	-0.10

Table 2.3 also shows the 95 percent confidence interval associated with the difference in attitude scores between Year 4 and Year 8 students. Confidence intervals are used throughout the report and provide a range within which we can be fairly sure the population value for the reported statistic lies. The confidence intervals have been adjusted to account for any design effect created through the sampling procedure (i.e. sampling schools and then sampling students). As a general rule of thumb, when the confidence intervals for two groups do not overlap we can have some confidence that the difference in the statistic reported for the groups represents a real difference at the population level. In other words, the difference is not just the result

of the kind of random variation that occurs in sampling studies. In this case we regard the difference as statistically significant.

In this report, any score differences between groups shown in tables are shown in bold font when their associated confidence intervals do not include zero. For instance, in Table 2.3, the Year 8–Year 4 difference of -2 scale score units is in bold font — the difference is considered to be statistically significant.

Effect sizes have been used to help interpret differences between groups. An effect size quantifies the difference between the average scores for two groups in terms of standard deviation units. The calculation of the effect sizes in this report weights the standard deviation for each group by its sample size. Because the standard deviations for groups are often different, this can mean that the same difference in scale score units results in slightly different effect sizes for different pairs of groups. When comparing two effect sizes, it is very important to refer back to the scale score differences to make sure any interpretations are valid.

The use of rounding

In the tables and text presented in this report, the average scores for each group and subgroup have been rounded to whole numbers. Some tables of findings report the difference between average scale scores for two groups or subgroups. These differences have been calculated using the non-rounded averages and are numerically correct. In some cases, the difference reported may not be the same as the simple difference between the pair of rounded averages shown in the table. All confidence intervals have been rounded to the nearest half scale score unit or percentage point.

3 Student Perspectives on Digital Technology

This chapter describes students’ attitudes to the use of digital devices for learning, their opportunities to use digital devices in school, and their access to and use of digital devices at home. A measure of Attitudes to Learning with Digital Devices (ALDD) was constructed, and reported within and across year levels by gender, ethnicity, special education needs, school decile and school type.

Detailed tables of means, standard deviations, sample sizes, effect sizes and 95 percent confidence intervals can be found in the Appendix.

1. Attitudes to learning with digital devices

Students were asked how much they agreed with a series of statements about their attitude to learning with digital devices. Figure 3.1 shows the statements and how the students responded by year level. In general, most students expressed various levels of agreement with the attitude statements. Over two thirds of Year 4 and Year 8 students responded ‘Agree a lot’ or ‘Totally agree’ to each statement.

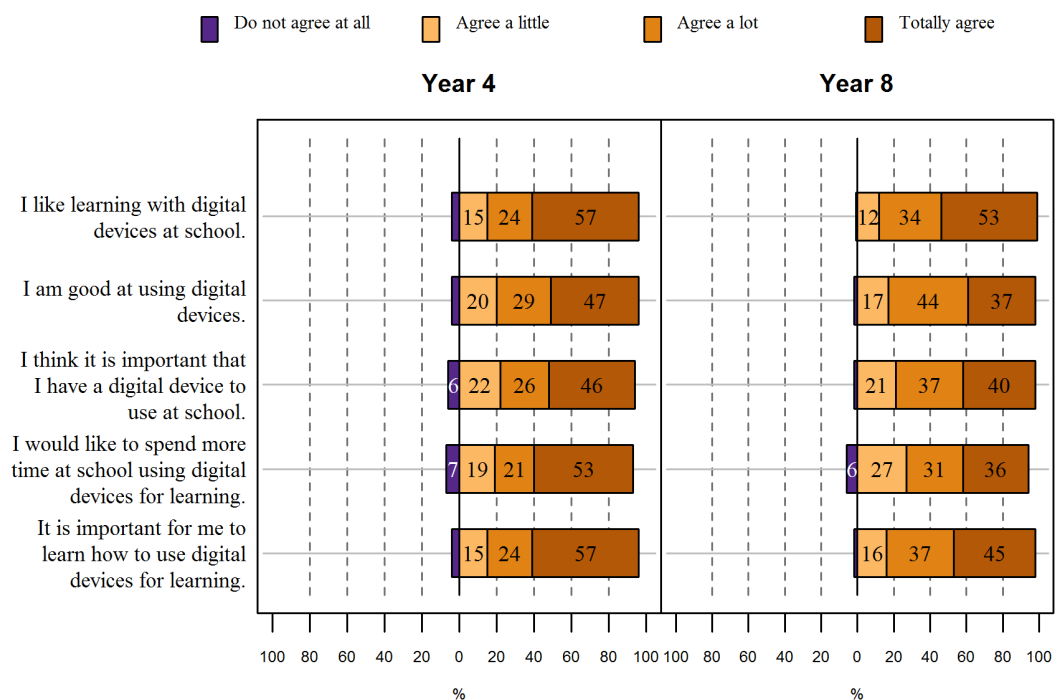


Figure 3.1 Percentage frequency of responses by Year 4 and 8 students about their attitudes to learning with digital devices

An IRT scale was constructed based on the students' responses to these statements. The scale was called the Attitude to Learning with Digital Devices (ALDD) scale. Figure 3.2 shows the distributions of scores on the ALDD scale for Year 4 and Year 8 students. Students generally had 'Positive' to 'Very positive' ALDD scale scores. On average, Year 4 students were more positive than Year 8 students, although there was a great deal of overlap in the score distributions for Year 4 and Year 8.

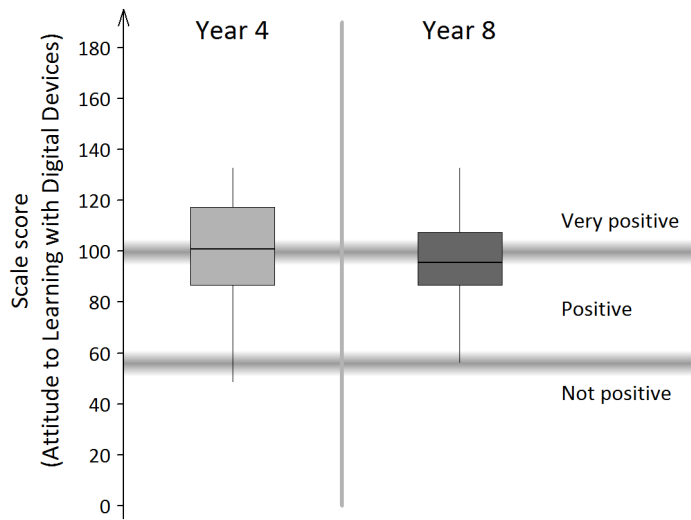


Figure 3.2 Distribution of scores on the ALDD scale, by year level

ALDD by student characteristics

Figures 3.3 and 3.4 display the score distributions on the ALDD scale at Year 4 and Year 8, respectively, by gender and ethnicity⁸.

Boys' scores were higher, on average, than girls' scores by 2–3 scale units at both year levels. The difference was statistically significant at both year levels, although the effect sizes of the differences at Year 4 and Year 8 were small (.10 and .17, respectively).

There were no statistically significant differences between students from different ethnic groups, and no differences between students with and without special education needs.



Figure 3.3 Distribution of scores for Year 4 students on the ALDD scale, by gender and ethnicity (NZE=New Zealand European)

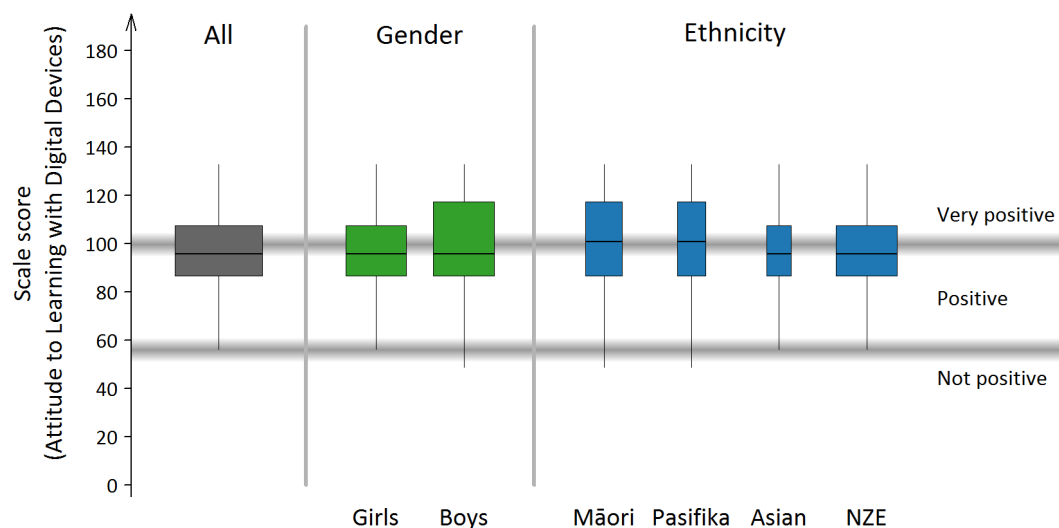


Figure 3.4 Distribution of scores for Year 8 students on the ALDD scale, by gender and ethnicity (NZE=New Zealand European)

⁸ 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 only. The 'Pasifika' 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 Australians, British/Irish, German, Dutch, Greek, Polish, South Slav, Italian and other Europeans, Middle Eastern, Latin American, African and Not Stated.

ALDD by school characteristics

Figures 3.5 and 3.6 show the ALDD scores according to school decile⁹ and school type¹⁰. At Year 4, the average score for students from high decile schools was greater than the average score for students from mid decile schools. At Year 8, the average scores for students from high and mid decile schools were lower than the average score for students from low decile schools. The differences were about 3–4 score units, with effect sizes from .15 to .21.

At Year 4, there were no statistically significant differences between the average scores for students at different school types. At Year 8, the average score for students at full primary schools was greater than the average score for students from secondary schools. The difference was 4 ALDD score units with an effect size of .21.

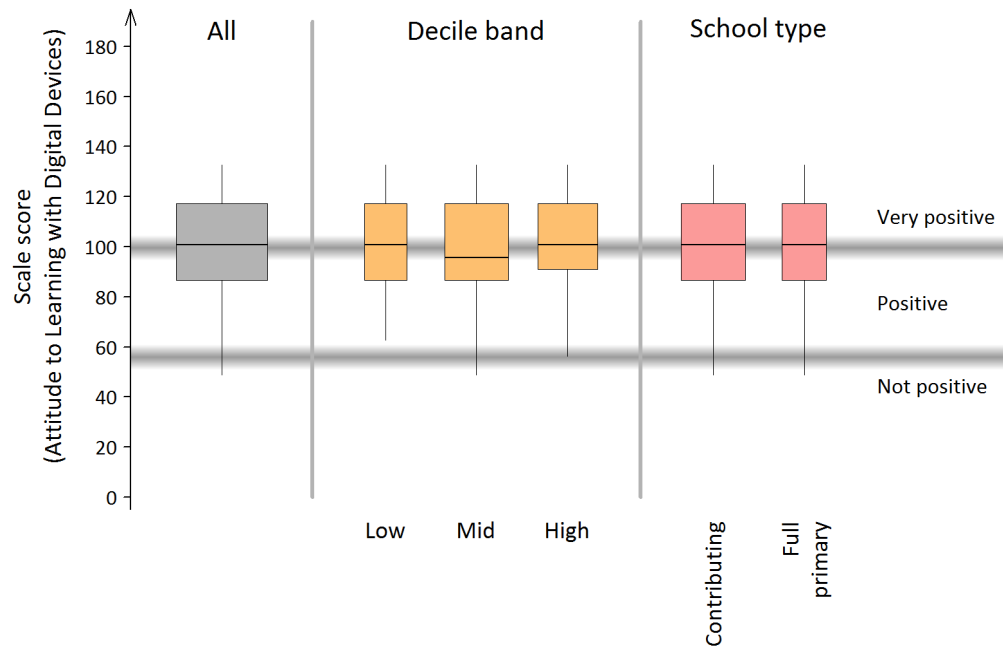


Figure 3.5 Distribution of scores for Year 4 students on the ALDD scale, by decile band and school type

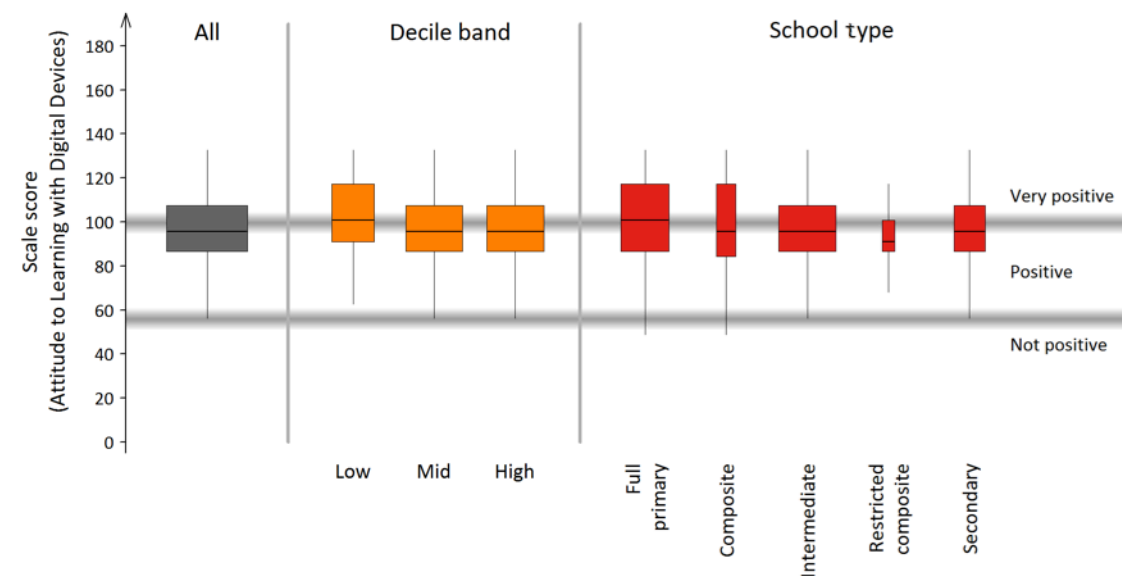


Figure 3.6 Distribution of scores for Year 8 students on the ALDD scale, by decile band and school type

⁹ 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.

¹⁰ 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.

Difference in ALDD scores between Year 4 and Year 8

Table 3.1 shows the difference between the average ALDD scale scores for Year 4 and Year 8 across a range of groups. There were significant differences for all students, girls, NZE students, and students from high decile schools. The effect sizes of the differences were small.

Table 3.1 Difference in average scores on the ALDD scale for Year 4 and Year 8, by subgroup

Attitude to Learning with Digital Devices score (ALDD units)					
	Year 4 average	Year 8 average	Year 8 – Year 4 difference in averages	Confidence interval for the difference	Effect size
Year					
All	101	99	-2	(-3.5, -0.5)	-0.10
Gender					
Girls	100	97	-3	(-4.5, -1.0)	-0.14
Boys	102	101	-1	(-3.5, 0.5)	-0.07
Ethnicity					
Māori	102	100	-2	(-4.5, 1.5)	-0.08
Pasifika	100	101	1	(-3.0, 5.0)	0.04
Asian	100	99	-1	(-4.5, 3.5)	-0.04
New Zealand European	102	98	-4	(-5.5, -2.0)	-0.18
School decile					
Low	101	102	0	(-3.0, 4.0)	0.02
Mid	100	99	-1	(-3.0, 1.5)	-0.05
High	103	98	-5	(-7.0, -2.5)	-0.25
Special education needs					
SEN (combined)	101	99	-1	(-8.0, 5.0)	-0.06

2. Opportunities to use digital devices at school

Students were asked about the opportunities they had to use digital devices at school. Figures 3.7 and 3.8 show their responses by year level.

In general, the majority of students at both year levels reported having frequent opportunities to use digital devices in school. At least 40 percent of students at Year 4 used digital devices ‘Very often’ to ‘Learn about using the Internet safely’, ‘Search for information on the Internet’ and ‘Use online learning activities/games’. At Year 8, 63 percent of students used digital devices ‘Very Often’ to ‘Search for information on the Internet’.

At both levels, boys and girls’ responses were similar. At Year 4, boys were more likely than girls to ‘Watch an online activity that is happening in another place’. At Year 8, girls were more likely than boys to ‘Create digital texts’ and ‘Search for information on the Internet’. The effect sizes of the gender differences were small.

The responses of students from different decile bands were similar across year levels. The differences were typically of small effect sizes. Generally, students from low decile schools had the most frequent opportunities to learn with digital devices, with two exceptions. At Year 4, students from high decile schools had more frequent opportunities to ‘Search for information on the Internet’ compared to students from mid decile schools; with regards to opportunities to ‘Create digital texts,’ there were no decile differences.

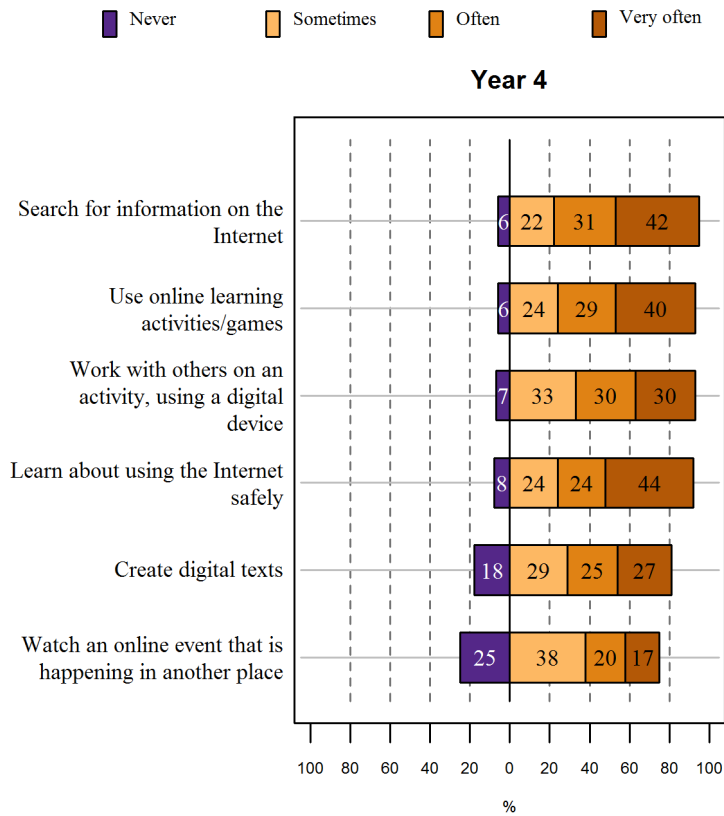


Figure 3.7 Percentage frequency of Year 4 students' responses to statements about learning opportunities to use digital devices in school

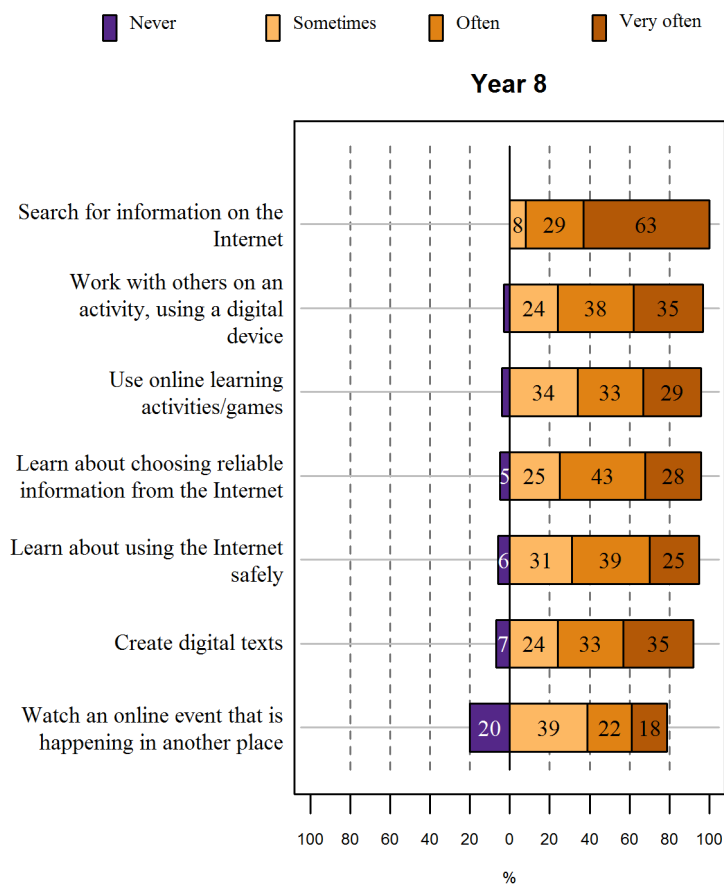


Figure 3.8 Percentage frequency of Year 8 students' responses to statements about learning opportunities to use digital devices in school

ALDD scores and opportunities to use digital devices in school

Correlations between ALDD scores and the statements about opportunities to use digital devices in school were calculated. The correlations are presented in Table 3.2. All the correlations at Year 4 and Year 8 were statistically significant ($p < .01$).

Table 3.2. Correlations between ALDD scores and opportunities to use digital devices at school, by year level

Correlations between ALDD scores and opportunities		
	Year 4 (N=2316)	Year 8 (N=2216)
	r	r
Search for information on the Internet	.27	.23
Use online learning activities/games	.28	.25
Work with others on an activity, using a digital device	.30	.27
Watch an online event that is happening at another place	.22	.18
Create digital texts	.24	.20
Learn about using the Internet safely	.24	.25
Learn about choosing reliable information from the Internet	-	.29

As an example, Figures 3.9 and 3.10 illustrate the correlation between ALDD scores and responses to the opportunity to ‘Work with others on a digital device’ for Year 4 and Year 8, respectively. At both year levels, students who responded ‘Very often’ had a mean ALDD score in the ‘Very positive’ region, whereas students who responded ‘Never/sometimes’ had a mean score in the ‘Positive’ region. However, a correlation does not imply causation. Although one might consider that more opportunities to use digital devices may lead to more positive attitudes, it is possible that more positive attitudes may lead to more positive responses to questions regarding opportunities, or that some other third factor links attitudes and opportunities. Nevertheless, it is worth noting that a significant relationship of moderately small to medium effect sizes exists between attitudes and opportunities to use digital devices at school.

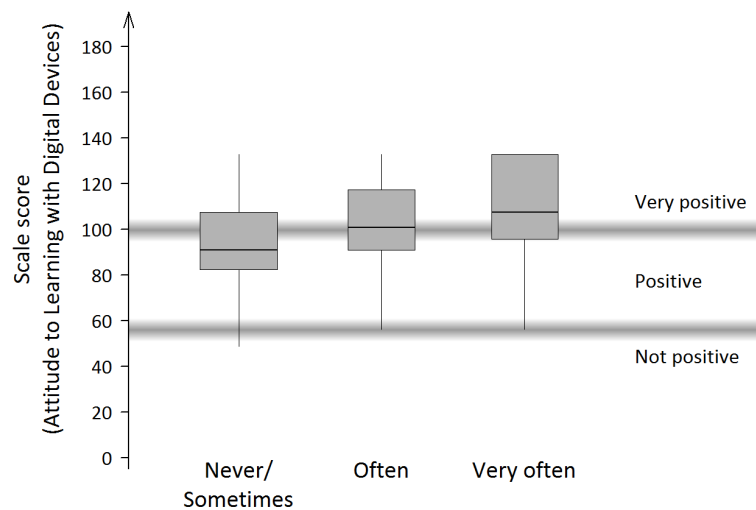


Figure 3.9 Distribution of scores for Year 4 students on the ALDD scale, by responses to the opportunities students have to ‘Work with others on a digital device’

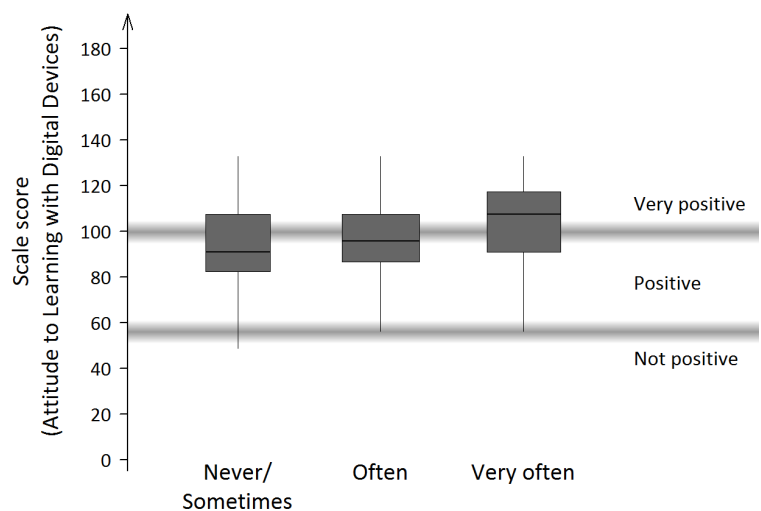


Figure 3.10 Distribution of scores for Year 8 students on the ALDD scale, by responses to the opportunities students have to ‘Work with others on a digital device’

3. Access to the internet and digital devices at home

Students were asked if they had internet access at home. The vast majority of students at both year levels had Internet access at home (Year 4: 81 percent, Year 8: 94 percent). At both year levels, less than 6 percent did not have Internet access, and the remaining 13 percent of Year 4 students and 1 percent of Year 8 students responded ‘Don’t know’.

Students were also asked which of the following digital devices they have at home and were allowed to use: Desktop computer, Tablet/iPad, Notebook/laptop, Smartphone, Other or None. Figure 3.11 displays students’ responses by year level and school decile. Differences by year level and school decile were examined statistically using chi-square analyses.

At both year levels, about two thirds of students reported having a desktop computer at home that they were allowed to use, and about three quarters had access to the use of a tablet/iPad. A greater proportion of Year 8 students than Year 4 reported having, and being allowed to use, a notebook/laptop (69 percent vs 47 percent), and a smartphone (77 percent vs 40 percent).

With regards to school decile, access to digital devices at home was generally lowest for students from low decile schools. For example, the proportions of Year 4 students from low, mid and high decile schools who had access to a Tablet/iPad were 62, 77 and 84 percent, respectively.

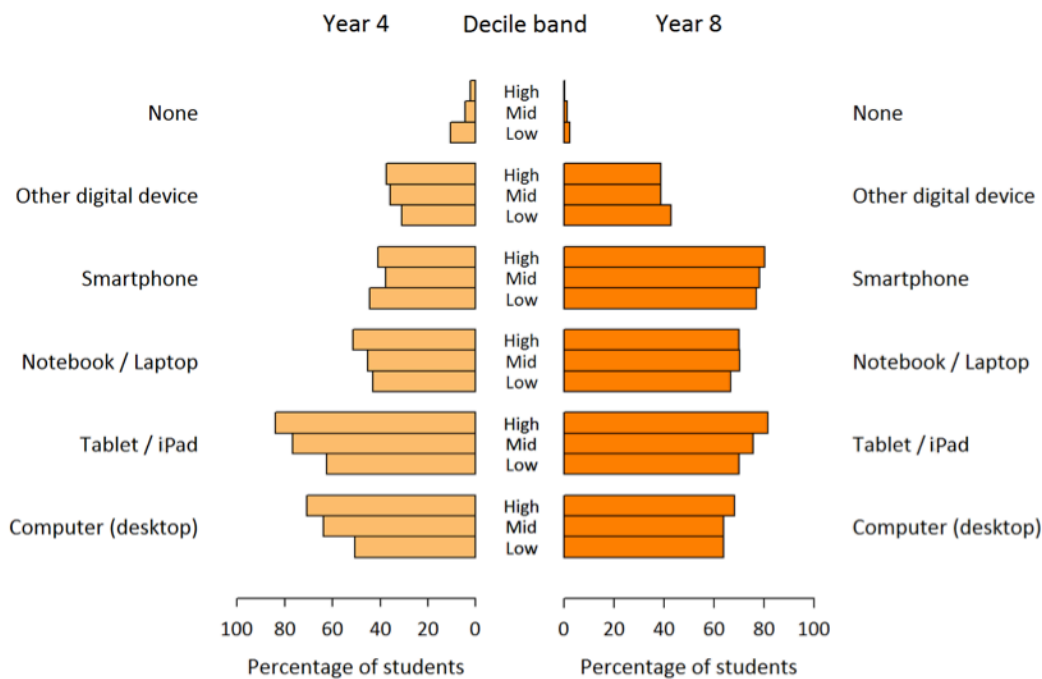


Figure 3.11 Percentage frequency of students’ responses about access to digital devices at home by year level and school decile

4. Summary

Students generally had positive to very positive attitudes to learning with digital devices. Year 4 students generally scored higher than Year 8 students, although there was a great deal of overlap in the score distributions for Year 4 and Year 8.

Boys scored higher, on average, than girls at both year levels. There were no statistically significant differences between ethnic groups. At Year 4, the average score for students from high decile schools was greater than the average score for students from mid decile schools. At Year 8, the average scores for students from high and mid decile schools were lower than the average score for students from low decile schools.

In general, the majority of students at both year levels reported having had opportunities to use digital devices at school. At both levels, boys' and girls' responses were generally similar, as were the responses of students from schools in different decile bands. There were significant correlations of moderately small to medium effect sizes between ALDD scale scores and opportunities to use digital devices at school.

The majority of students at both year levels had Internet access at home. At both year levels, about two thirds of students reported having a desktop computer at home that they were allowed to use, and about three quarters had access to the use of a tablet/iPad. A greater proportion of Year 8 students than Year 4 reported having, and being allowed to use a notebook/laptop, or a smartphone. With regards to school decile, access to digital devices at home was generally lowest for students from low decile schools.

4 Teacher and Principal Perspectives

This chapter uses data collected from teacher and principal questionnaires to describe their perspectives regarding the use of digital technologies for teaching and learning in school. Teachers were asked about their attitudes to using digital technology for teaching and learning, and about students’ opportunities to use digital technologies for learning at school. Teachers and principals were asked about the effects of using digital technologies for teaching and learning, and principals were asked about their perspectives on the level of support for implementing digital technologies in their schools.

1. Teacher engagement and confidence to using digital technologies in school

Teachers were asked about their engagement with, and confidence to use, digital technologies for teaching and learning. Figure 4.1 displays their responses by year level. At both year levels, the majority of teachers were positive about digital technology. Over 75 percent of Year 4 and Year 8 teachers responded ‘Moderately true’ or ‘Very true’ to all the statements. This finding was generally similar across decile bands. Differences by gender, year level and school decile were examined statistically using ANOVA. There were no year level and no gender differences for the teachers.

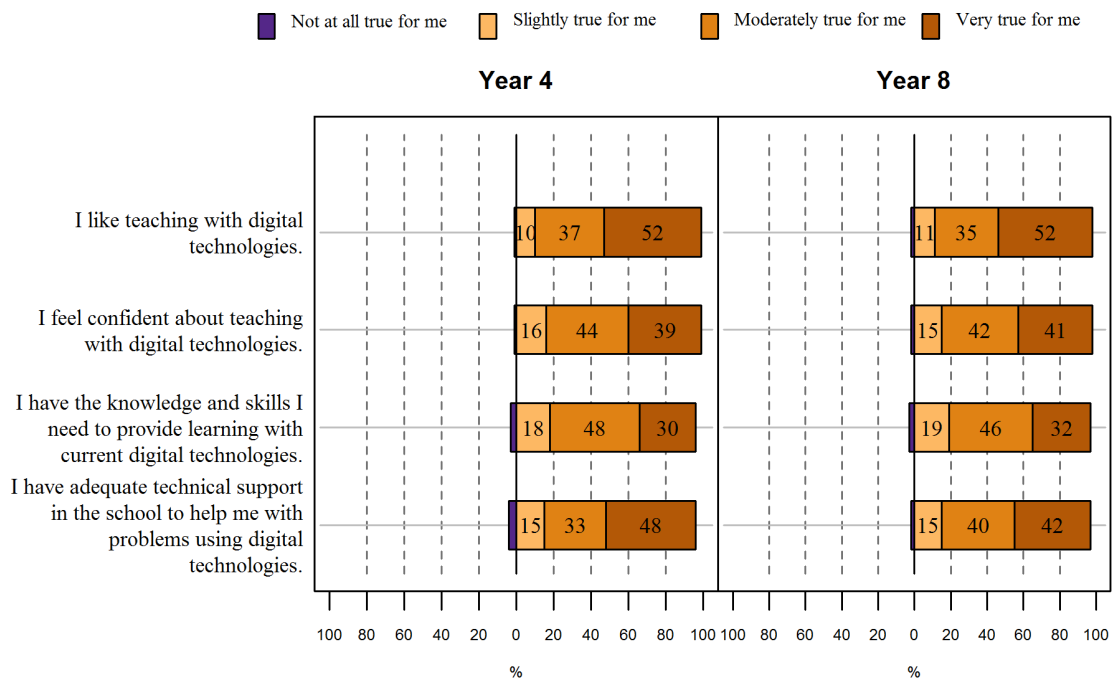


Figure 4.1 Percentage frequency of responses by teachers to statements about engagement and confidence to use digital technologies in the classroom, by year level

2. Opportunities for students to use digital technologies in school

Teachers were asked about students’ opportunities to use digital technologies at school. Figure 4.2 displays their responses by year level. At both year levels, the majority of teachers responded that their students had many opportunities (‘Quite often’ or ‘Very often’) to use digital technologies. Over 50 percent of Year 4 teachers and over 40 percent of Year 8 teachers responded ‘Very often’ to the following opportunities: ‘Search for information on the internet’, ‘Use online learning activities/games’ and ‘Work with others on an activity using a digital device’. This finding was generally similar across decile bands. Year 4 teachers provided more frequent opportunities than Year 8 teachers in the following areas: ‘Use online learning

activities/games’, ‘Work with others on an activity using a digital device’, and ‘Watch an event online that is happening in another place’. Year 8 teachers provided more frequent opportunities than Year 4 teachers in learning about programming. The opportunities which about half to two thirds of students did not experience were: ‘Take part in classes online that are given by another teacher’ and ‘Learn about programming’. There were no gender differences in the teacher responses about the opportunities available for students to use digital devices in school.

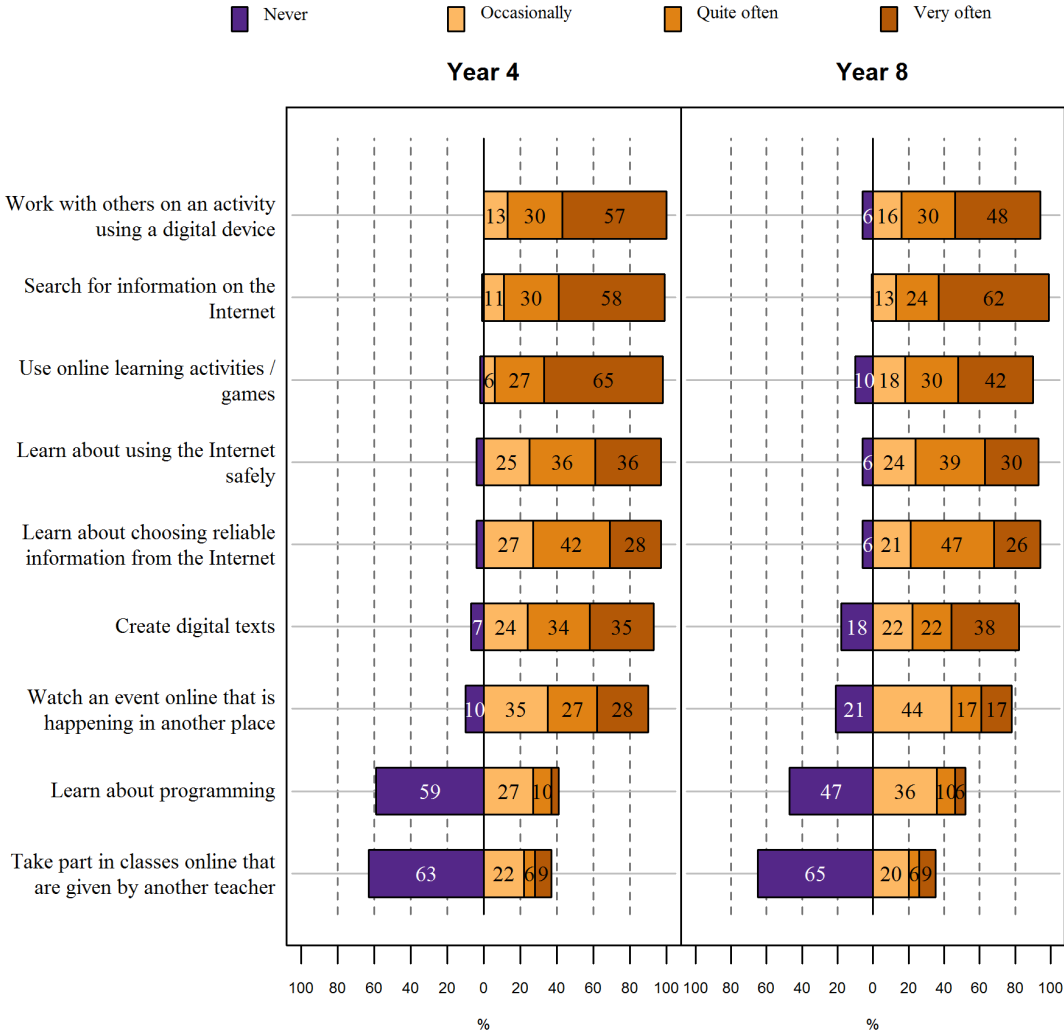


Figure 4.2 Percentage frequency of responses by teachers to statements about opportunities for students to use digital devices in school, by year level

Comparing teacher and student perspectives of opportunities to use digital devices at school

With regards to opportunities to use digital devices at school, Year 4 teachers answered the same six statements as those for students, and an additional three questions (‘Take part in classes online that are given by another teacher’, ‘Learn about choosing reliable information from the Internet’ and ‘Learn about programming (coding)’). Year 8 teachers answered the same seven statements, and an additional two questions (‘Take part in classes online that are given by another teacher’, and ‘Learn about programming (coding)’). Both teachers and students indicated that the majority of students have had opportunities to use digital devices in school. For example, at Year 4, 94 percent of students and 99 percent of teachers indicated that students had opportunities (any response other than ‘Never’) to ‘Search for information on the Internet’; at Year 8, the figures were 100 percent of students and 99 percent of teachers. Generally, teachers reported slightly higher levels of opportunities for students to use digital devices in school compared to students’ reported experiences. For example, 65 percent of Year 4 teachers and 42 percent of Year 8 teachers responded ‘Very often’ that students have opportunities to ‘Use online learning activities/games’, compared with 40 percent of Year 4 students and 29 percent of Year 8 students indicating ‘Very often’.

3. Effects of using digital technologies for teaching and learning

This section describes how teachers and principals responded to questions about the effects of digital technologies for teaching and learning.

Teacher Perspectives

Figure 4.3 displays teachers' responses to statements about the effects of digital technologies for teaching and learning, by year level. At both year levels, the majority of teachers were positive about the effects of digital technology on students' learning. Over 90 percent of teachers at both year levels responded 'Agree' or 'Strongly agree' to the following statements: 'It has helped my students integrate knowledge from more than one learning area', 'It has increased my students' engagement in their learning', 'It has made me think about new ways of teaching and learning', 'It has allowed some of my students to show knowledge and skills that were not so evident with pen and paper'. At Year 4, over 90 percent of teachers responded 'Agree' or 'Strongly agree' to the following item: 'it has made positive changes to the way my students learn'. Compared to Year 8 teachers, Year 4 teachers were more likely to agree that digital technology had had the following effects: 'It has increased my students' engagement in learning' (98.6 percent vs 94 percent for Year 4 vs Year 8); 'It has allowed some of my students to show knowledge and skills that were not so evident with pen and paper' (95.4 percent vs 91.1 percent); 'It has made positive changes to the way my students learn' (95 percent vs 88 percent). There were no gender or school decile differences in the teacher responses.

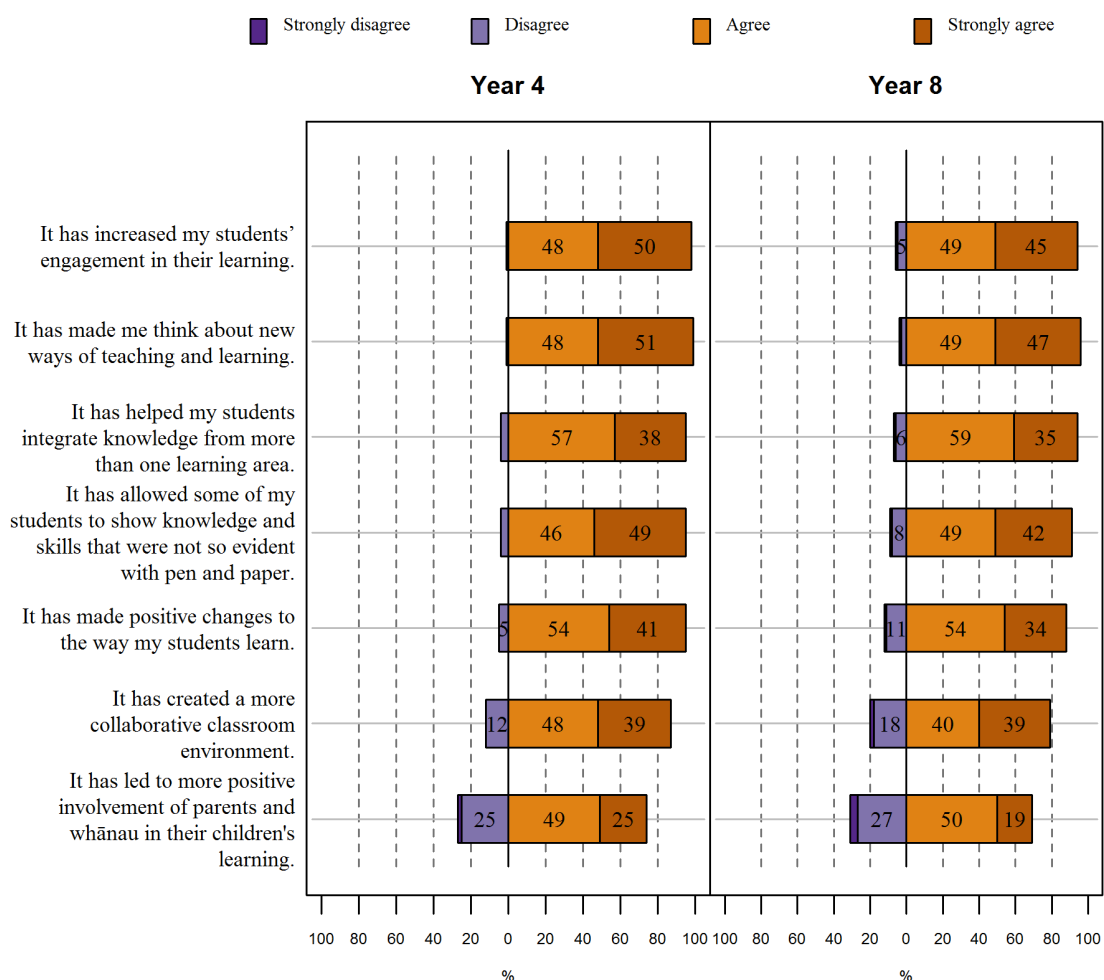


Figure 4.3 Percentage frequency of responses by teachers about the effects of digital technology on teaching and learning, by year level

Principal Perspectives

Principals were also asked about the effects of using digital technologies for teaching and learning. Figure 4.4 displays their responses by year level. At both year levels, the majority of principals were positive about the effects of digital technology on students' learning. Over 90 percent of the principals, responded 'Agree' or 'Strongly agree' to the statements. This finding was generally similar across decile bands. There were no year level differences in the principal responses.

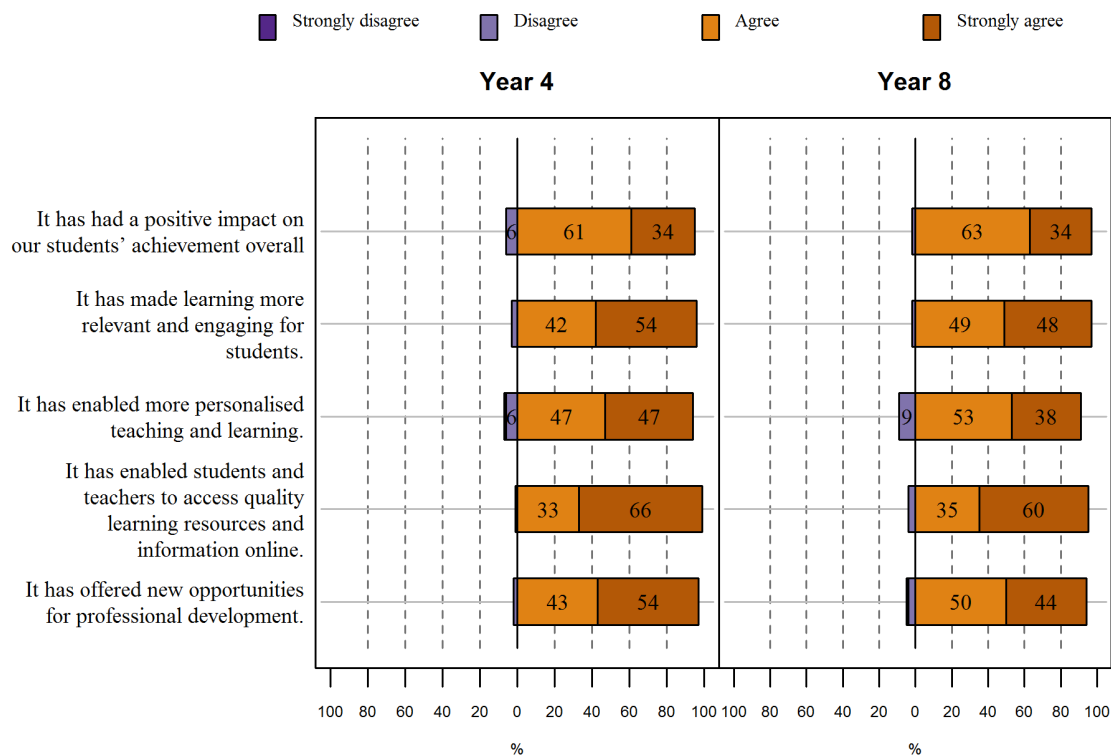


Figure 4.4 Percentage frequency of responses by principals about the effects of digital technology on teaching and learning, by year level

4. Support for implementing learning with digital technologies at school

Principals were asked about their perspectives on the level of support for implementing digital technologies in their schools. Figure 4.5 displays their responses by year level. At both year levels, the majority of principals were positive about the level of support for implementing digital technologies in their school. Over 90 percent of principals at both levels responded 'Agree' or 'Strongly agree' to the following statements: 'The digital technologies we have in our school are reliable', and 'Internet access is adequate and reliable'. Over 90 percent of principals at Year 8 responded 'Agree' or 'Strongly agree' to the following statements: 'Our school has adequate expertise to support good quality teaching and learning with digital technologies', and 'Our school has good support to deal with any problems involving digital technologies'. Compared to Year 8 principals, Year 4 principals were more likely to agree with the level of support in the following area: 'Our school has adequate resources to support good quality teaching and learning with digital technologies' (85.6 percent vs 79.1 percent for Year 4 vs Year 8). There were no school decile differences in the principal responses.

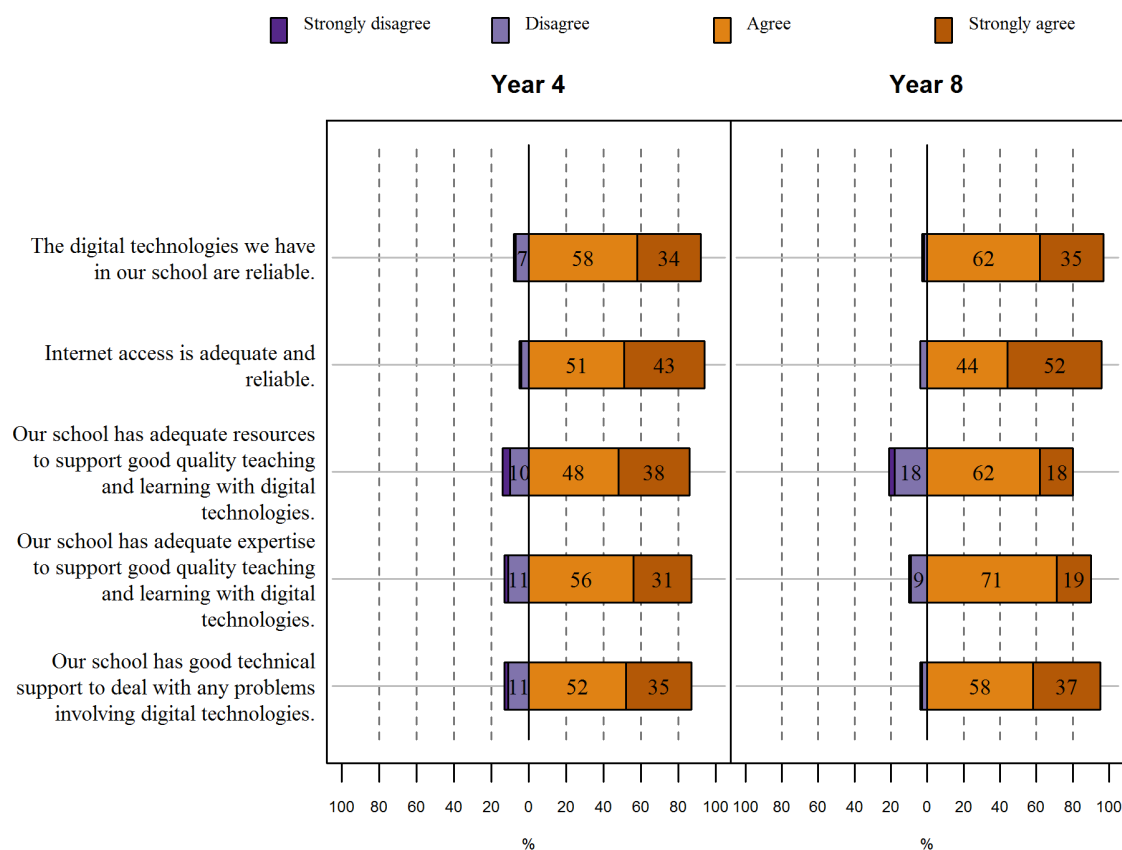


Figure 4.5 Percentage frequency of responses by principals about the support for implementing digital technologies in school, by year level

Summary

At both year levels, the majority of teachers were positive about digital technology. Over 75 percent of Year 4 and Year 8 teachers responded ‘Moderately true’ or ‘Very true’ to all the statements regarding their attitudes to digital technology. This finding was generally similar across decile bands. There were no year level or gender differences.

At both year levels, the majority of teachers responded that their students had opportunities to use digital technologies. Over 50 percent of Year 4 teachers and over 40 percent of Year 8 teachers responded ‘Very often’ to the following opportunities: ‘Search for information on the Internet’, ‘Use online learning activities/games’, and ‘Work with others on an activity using a digital device’. This finding was generally similar across decile bands.

Both teachers and students indicated that the majority of students have opportunities to use digital devices in school. Teachers reported slightly higher levels of opportunities for students to use digital devices in school compared to students’ reported experiences.

At both year levels, the majority of teachers and principals were positive about the effects of digital technology on students’ learning. Principals were also positive about the level of support for implementing digital technologies in their schools.

Appendix: Summary Statistics

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Note:

The tables present an 'actual sample size' and an 'effective sample size'. The latter makes an adjustment to the calculation of statistics because of the way the study is designed. That is, schools are sampled and then students are sampled from within those schools. See Appendix 3 of the Technical Information report for an explanation of the procedure used. This variance adjustment was done only for the analyses involving ALDD; for analyses involving opportunities to use digital devices in school, and access to digital devices at home, the variance was not adjusted but the significant differences were set at the $p < .01$ level.

Table A1.1 Attitude scores on the ALDD scale: Summary statistics for Year 4 students

Group	Actual sample size	Effective sample size	Mean	Confidence interval for the mean	Standard deviation
All	2316	1621	101	(100.0, 102.0)	21
Gender					
Girls	1143	800	100	(98.5, 101.5)	20
Boys	1173	821	102	(100.5, 103.5)	21
Ethnicity					
Māori	563	394	102	(100.0, 104.0)	21
Non-Māori	1753	1227	101	(99.5, 102.0)	21
Pasifika	300	210	100	(97.5, 103.5)	23
Non-Pasifika	2016	1411	101	(100.0, 102.0)	20
Asian	200	140	100	(97.0, 103.0)	18
Non-Asian	2116	1481	101	(100.0, 102.0)	21
NZE	1472	1030	102	(100.5, 103.0)	20
Non-NZE	844	591	100	(98.0, 101.5)	22
Decile band					
Low decile	444	311	101	(98.5, 104.0)	23
Mid decile	1000	700	100	(98.0, 101.0)	21
High decile	872	610	103	(101.0, 104.0)	19
School type					
Contributing school	1529	1070	102	(100.5, 103.0)	20
Full primary school	743	520	100	(98.0, 102.0)	21
Composite school (Year 1-15)	44	31	97	(89.5, 105.0)	22
Special education needs					
SEN (combined)	185	130	100	(96.0, 104.0)	24
No SEN	2131	1492	101	(100.0, 102.0)	20

Table A1.2 Attitude scores on the ALDD scale: Summary statistics for Year 8 students

Group	Actual sample size	Effective sample size	Mean	Confidence interval for the mean	Standard deviation
All	2262	1583	99	(98.0, 100.0)	19
Gender					
Girls	1119	783	97	(96.0, 98.5)	19
Boys	1143	800	101	(99.0, 102.0)	19
Ethnicity					
Māori	509	356	100	(98.5, 102.5)	19
Non-Māori	1753	1227	99	(97.5, 99.5)	19
Pasifika	306	214	101	(98.5, 104.0)	19
Non-Pasifika	1956	1369	99	(97.5, 99.5)	19
Asian	226	158	99	(96.5, 102.0)	17
Non-Asian	2036	1425	99	(98.0, 100.0)	19
NZE	1413	989	98	(97.0, 99.5)	19
Non-NZE	849	594	100	(99.0, 102.0)	20
Decile band					
Low decile	494	346	102	(99.5, 103.5)	19
Mid decile	874	612	99	(97.0, 100.0)	20
High decile	894	626	98	(96.5, 99.0)	19
School type					
Full primary school	741	519	101	(99.0, 102.5)	20
Intermediate school	120	84	99	(94.5, 104.0)	22
Composite school (Year 1-15)	1036	725	99	(97.5, 100.0)	18
Secondary school (Year 7-15)	51	36	96	(90.5, 101.0)	16
Restricted composite school (Year 7-10)	314	220	96	(94.0, 99.0)	20
Special education needs					
SEN (combined)	126	88	99	(93.5, 103.5)	24
No SEN	2133	1493	99	(98.0, 100.0)	19

Table A1.3 Differences between subgroup means for Year 4 students

Subgroup 1	Effective sample size subgroup 1	Subgroup 2	Effective sample size subgroup 2	Difference in means*	CI for the difference in means	Effect size
Gender						
Girls	800	Boys	821	-2	(-4.0, -0.0)	-0.10
Ethnicity						
Māori	394	Non-Māori	1227	1	(-1.0, 3.5)	0.06
Pasifika	210	Non-Pasifika	1411	-1	(-4.0, 2.5)	-0.04
Asian	140	Non-Asian	1481	-1	(-4.5, 2.0)	-0.06
NZE	1030	Non-NZE	591	2	(-0.0, 4.0)	0.10
Decile band						
High decile	610	Mid decile	700	3	(1.0, 5.0)	0.15
High decile	610	Low decile	311	1	(-1.5, 4.5)	0.07
Mid decile	700	Low decile	311	-2	(-4.5, 1.5)	-0.07
School type**						
Contributing school	1070	Full primary school	520	1	(-0.5, 3.5)	0.07
Special education needs						
No SEN	1492	SEN (combined)	130	1	(-3.0, 5.5)	0.05

* Differences in means in bold font are statistically significant

** Composite (Yr 1-15) schools comparisons excluded, N=31

Table A1.4 Differences between subgroup means for Year 8 students

Subgroup 1	Effective sample size subgroup 1	Subgroup 2	Effective sample size subgroup 2	Difference in means*	CI for the difference in means	Effect size
Gender						
Girls	783	Boys	800	-3	(-5.0, -1.5)	-0.17
Ethnicity						
Māori	356	Non-Māori	1227	2	(-0.5, 4.0)	0.09
Pasifika	214	Non-Pasifika	1369	3	(-0.0, 5.5)	0.14
Asian	158	Non-Asian	1425	0	(-2.5, 3.0)	0.01
NZE	989	Non-NZE	594	-2	(-4.0, -0.0)	-0.12
Decile band						
High decile	626	Mid decile	612	-1	(-3.0, 1.0)	-0.05
High decile	626	Low decile	346	-4	(-6.5, -1.5)	-0.21
Mid decile	612	Low decile	346	-3	(-5.5, -0.5)	-0.16
School type**						
Full primary school	519	Intermediate school	725	2	(-0.0, 4.0)	0.10
Full primary school	519	Secondary school (Year 7-15)	220	4	(1.0, 7.5)	0.21
Intermediate school	725	Secondary school (Year 7-15)	220	2	(-1.0, 5.0)	0.12
Special education needs						
No SEN	1493	SEN (combined)	88	0	(-4.5, 5.5)	0.02

* Differences in means in bold font are statistically significant

** Restricted composite and composite (Year 1-15) comparisons excluded, N=36 and N=84, respectively.

Table A1.5 Differences between attitudes on ALDD for Year 4 and Year 8 by subgroup

Group	Year 8 effective sample size	Year 4 effective sample size	Year 8–Year 4 difference in means	CI for difference in means	Effect size
All	1583	1621	-2	(-3.5, -0.5)	-0.10
Gender					
Girls	783	800	-3	(-4.5, -1.0)	-0.14
Boys	800	821	-1	(-3.5, 0.5)	-0.07
Ethnicity					
Māori	356	394	-2	(-4.5, 1.5)	-0.08
Pasifika	214	210	1	(-3.0, 5.0)	0.04
Asian	158	140	-1	(-4.5, 3.5)	-0.04
NZE	989	1030	-4	(-5.5, -2.0)	-0.18
Decile band					
Low decile	346	311	0	(-3.0, 4.0)	0.02
Mid decile	612	700	-1	(-3.0, 1.5)	-0.05
High decile	626	610	-5	(-7.0, -2.5)	-0.25
Special education needs					
SEN (combined)	88	130	-1	(-8.0, 5.0)	-0.06

