NZCER national survey of primary and intermediate schools 2016:
Methodology and sample information

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Rangahau Mātauranga o Aotearoa

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1.
Introduction

This report describes sampling and analysis details for the NZCER national survey of primary and intermediate schools 2016,[1] as well as respondent characteristics and characteristics of the schools with which respondents are associated. It supports the individual thematic reports that use the 2016 National Survey data.

1 Shortened to the National Survey in this document.

2. Methodology

Data collection

Our study populations were principals and teachers working in English-medium primary and intermediate schools, trustees on the schools' boards and parents and whānau of children attending those schools.

The first stage of our sampling was to select schools to be part of the National Survey, and the second stage was to select individuals associated with these schools who would be invited to participate.

To sample schools, we created a sampling frame—a list that contains only and all the schools we want to include in the National Survey.

Sampling frame

The Ministry of Education provides a complete directory of New Zealand schools.[2] It is from this directory that the sampling frame was created in June 2016. The directory containing July 2015 school roll and profile data was used because only a preliminary roll count is available in March each year, with an updated version released in July.

Schools in the sampling frame were state and state-integrated, full and contributing primary and intermediate schools.

We did not include any school with the definition:

- Kura Kaupapa Māori
- Bilingual school.

We excluded 175 eligible schools from this sampling frame that had already been selected to take part in the National Monitoring Study of Student Achievement, which was running concurrently, to help maximise response rates for both projects.

Table 1 shows a summary of the characteristics of the schools in the sampling frame. The sampling frame included a total of 1,699 primary and intermediate schools.

2 See https://www.educationcounts.govt.nz/data-services/directories/list-of-nz-schools

TABLE 1 **Summary of schools in the sampling frame**

Characteristic	Category	*n*	%
Decile	1–2	336	20
	3–4	324	19
	5–6	338	20
	7–8	340	20
	9–10	361	21
Size	Small	545	32
	Small–medium	419	25
	Medium–large	368	22
	Large	367	22
Type	Contributing	699	41
	Full	928	55
	Intermediate	72	4
Location	Metropolitan	850	50
	Small city	90	5
	Minor urban	179	11
	Rural	580	34

Drawing the school sample

We used a stratified random sampling approach to sample 349 schools to be in the National Survey. The strata were defined by school socioeconomic decile and size. School deciles were grouped into quintiles (quintile 1 is decile 1 and 2, quintile 2 is decile 3 and 4, etc.) and are referred to as 'decile bands'. School roll was grouped to create size categories (schools with 100 or fewer students were categorised as small, 101–200 students as small–medium, 201–350 students as medium–large and 351 students or more as large).

Table 2 shows the distribution of schools in the sampling frame by school quintile and size. The number of schools included in the sample from each stratum was proportional to the number of schools in each stratum of the sampling frame. For example, about 7%of schools in the sample were large decile 1–2 schools because 6.9% of the schools in the sampling frame fell into this category.

TABLE 2 **Sampling strata for schools in the 2016 National Survey**

Decile band	Size %			
	Small	Small–medium	Medium–large	Large
Decile 1–2	3.3	4.3	5.2	6.9
Decile 3–4	3.2	4.4	5.8	5.7
Decile 5–6	3.6	3.4	5.1	7.8
Decile 7–8	4.8	4.9	3.8	6.5
Decile 9–10	6.7	4.6	4.8	5.2

Sampling was carried out in the software environment R[3], with the package 'sampling'.[4] This process randomly selected *schools* to be in the National Survey.

Principal sample

There is only one principal per school, so the selection of a school was also the selection of a principal.

Teacher sample

We estimated the number of teachers in each school using the Ministry of Education's staffing calculation, which is based on each school's roll at each year level.[5] We sent half this number of surveys (i.e., an estimated number of surveys for one in every two teachers) to each school.

The teacher surveys were sent to schools with requests to "give the survey to every second teacher on your staff list, or put a survey in every second person's pigeonhole".

Trustee sample

Two trustee surveys were sent to each school, one for the board chair and the other for a trustee of the chair's choosing. The chair was asked to select "another trustee who might perhaps convey a different view to yours on some issues", and not to select a trustee who was the principal or staff representative.

Parent and whānau sample

A subset of schools was selected from the main sample to take part in the parent and whānau survey. Thirty-six schools were selected to approximately reflect the decile and size characteristics of the sampling frame.

We invited schools to take part in the parent survey. If a school declined the invitation, another school with the same decile and size characteristics was selected in its place. This process continued until we had 36 schools agreeing to take part in the parent and whānau survey. We contacted a total of 61 schools to achieve a sample of 36 schools taking part.

3 R Core Team. (2016). *R: A language and environment for statistical computing.* R Foundation for Statistical Computing, Vienna, Austria. URL https://www.R-project.org/

4 Yves Tillé & Alina Matei. (2015). *sampling: Survey sampling*. R package version 2.7. URL https://CRAN.R-project.org/package=sampling

5 For details on how staffing is calculated, see http://www.education.govt.nz/school/running-a-school/resourcing/school-staffing/entitlement-staffing/curriculum-staffing/

We estimated the number of parent and whānau surveys to send to each school by taking 80% of the school roll (to allow for multiple students from the same family), and sent a survey for one in every four of the estimated number of families at each school.

The parent and whānau surveys were sent to schools with guidance to carry out a systematic random sample using their roll to select families for the survey. Schools were asked not to send the surveys to parents who were also trustees or teachers at the school.

Questionnaire development

The National Survey is conducted with primary and intermediate schools every 3 years to show what is happening in schools and how policy is playing out over time. The starting point for developing the questionnaires for 2016 was the 2013 questionnaires. To identify the key themes to include in 2016, the project team consulted initially with NZCER colleagues and then with: the Ministry of Education (MoE), the New Zealand Principals' Federation (NZPF), the New Zealand Educational Institute (NZEI), the New Zealand School Trustees' Association (NZSTA) and the Education Review Office (ERO). Later, these groups also gave helpful feedback on draft questionnaires.

To enable us to track change over time, some items are kept constant from previous questionnaires (e.g., principal and teacher morale). In some instances, new items are developed to update an existing theme; in others, a completely new theme is added. New questions are developed by NZCER researchers and reviewed by our NZCER National Survey team, MoE, ERO and the sector organisations named above.

The questionnaires comprise predominantly closed-response, many with agreement scales. We also include some open-response items to give respondents alternative opportunities to express their individual views.

Data analysis

The majority of data collected in the National Survey is categorical, and we report the results as proportions or percentages.

Margins of error for the National Survey

The *standard error* of a proportion is a measure of precision—it indicates how variable the proportion might be if (theoretically) we sampled over and over again.

The *margin of error* is 1.96*standard error. Statistical theory tells us that we can be 95% confident the true (population) proportion is inside the interval found by adding and subtracting the margin of error from the proportion.[6] A proportion +/- the margin of error for that proportion is the *confidence interval*.

Maximum margin of error

We report a *maximum margin of error* for our surveys. This calculation is based on a response of 50%, which is where the margin of error is the largest it can be for a given sample size. We report the maximum margin of error so that every percentage reported for the full sample will be covered by this margin (albeit conservatively the further the percentage is from 50%). Table 3 gives the maximum margins of error for the achieved sample for each survey, in percentages.

6 For the difference between two proportions: the margin of error for the difference between two proportions is larger than either of the margins of error for the constituent proportions. This means that we are less certain about what the difference between two proportions is than we are about the individual proportions.

TABLE 3 **Survey responses and maximum margins of error for each survey**

Survey	*n*	Margin of error %
Principal	200	6.9
Teacher	771	3.5
Trustee	176	7.4
Parent and whānau	504	*

* As the sample of parent schools is not a random sample, statistical theory does not apply and it would be misleading to calculate a margin of error for the parent survey.

Margins of error for any subset of our survey sample

The maximum margin of error (the margin of error at 50%) for the entire survey sample is not applicable when we report the proportion of a subset of the sample. The margin of error for a subset of the sample will be *greater* because the margin of error increases as the number of respondents decreases. Table 4 shows how the margin of error changes as the sample proportion and the sample size change. Looking down the first column where $n = 20$, the margin of error *increases* as the proportion increases. Looking across the first row where $p = 0.1$, the margin of error *decreases* as the sample size increases. Table 4 provides some reference for precision of percentages when subsamples are being discussed in the National Survey reports.

TABLE 4 **Margins of error for a range of percentages and sample sizes**

p	*n* = 20	*n* = 50	*n* = 100	*n* = 200
0.1	13.1	8.3	5.9	4.2
0.2	17.5	11.1	7.8	5.5
0.3	20.1	12.7	9.0	6.4
0.4	21.5	13.6	9.6	6.8
0.5	21.9	13.9	9.8	6.9

Approximate margins of error

We use an approximate margin of error for teachers and trustees. This is because:

- we ask schools to randomly sample teachers and trustees and therefore we can't guarantee that our sample is random
- our sample of teachers and trustees is clustered. For some of the things we ask about, teachers and trustees may give answers more similar to each other than to teachers and trustees in different schools. The implication of sampling clusters (i.e., schools) is a larger margin of error[7] for estimates of proportions.

7 While clustering can be accounted for by adjusting the standard error, this process has not been undertaken for the 2016 National Primary Schools Survey.

Chi-square tests

The Chi-Square Test of Independence with *p*-values calculated by simulation[8] was used to test for associations between pairs of variables. The significance level for all tests was 0.05; *p*-values less than or equal to 0.05 were considered significant, with a 5% risk of concluding that an association existed when there was no association.

All questions in every survey were cross-tabulated with the following school variables, with a Chi-square test carried out to test for an association with:

- quintile (school decile, grouped)
- size (school roll, grouped)
- urban area (four categories: metropolitan, small city, town, rural).

Additional relationships between other pairs of variables from the surveys were also explored.

Analysing qualitative data from open-response items

The largely closed-response items are supplemented by a smaller number of open-response items. There are two kinds of open-response items in the questionnaires: those that briefly describe an 'Other' response, and those that are responses to the invitation to make a comment. All open responses are compiled in a spreadsheet for analysis. For those that briefly describe an 'Other' response, we check to see if the response can reasonably be back-coded to an existing response option. For those that cannot, codes are developed (assuming their numbers warrant this).

In the case of comments that respondents have made, where there are sufficient responses these are coded. Codes are developed either by referring to codes used for the same item in the prevous survey, or—in the case of new items—by an iterative process of reading the responses and developing and applying codes that identify meaningful themes.

Illustrative examples of open responses are reported, along with the percentage of comments coded to amplify or extend what is shown by relevant closed-response items.

8 Monte Carlo simulation method with 2,000 replicates using the simulate p-value option in chisq.test() from the R package 'stats'.

3.

Response rates and respondent characteristics

Response rates 2016

Table 5 shows response rates for schools from which at least one survey was returned and for individual respondents. The high response rate from parent schools is because we sent surveys only to schools that had agreed to participate in the parent and whānau survey. While the response rates for teachers and parents are typical for the National Survey, the response rate for the trustees is low (in the 2013 national survey the response rate was 40%) and is higher for principals (in 2013 the response rate was 51%).

NZCER offered incentives to take part in the surveys: schools that were part of the parent and whānau survey were given a koha of $50, and individual parents, trustees, principals and teachers could go into a draw to win one of nine $100 gift cards.

TABLE 5 **Response rates 2016**

Group	Schools %	Individuals %
Principals	–	57.3
Teachers	65.3	38.2
Trustees	36.7	25.2
Parents and whānau	86.1	31.8

School characteristics

Principals and trustees

The following tables show how the achieved samples of principals and trustees compare with schools in the sampling frame, by decile band, school size and school location.

Each of the tables compares the percentages of responding principals and trustees in each category to the percentages of schools in the sampling frame in each category. As there is one principal per school, and an anticipated two responses per school from trustees, we would expect the distribution of principal and trustee respondents across decile band, size and location to be the same as the distribution of schools.

There are some small discrepancies between the sampling frame and the achieved sample. There is some under-representation of principals and trustees at schools in the lower decile band, and some over-representation of both groups at schools in the decile 9–10 band. There is some under-representation of both groups from small schools and rural schools, and some over-representation of both groups from large schools.

TABLE 6 **Principal and trustee respondents by school decile band**

Decile band	Principals %	Trustees %	Sampling frame schools %
1–2	18	17	20
3–4	18	16	19
5–6	18	23	20
7–8	22	21	20
9–10	26	24	21

TABLE 7 **Principal and trustee respondents by school size**

Size	Principals %	Trustees %	Sampling frame schools %
Small	29	25	32
Small–medium	24	24	25
Medium–large	22	22	22
Large	26	30	22

TABLE 8 **Principal and trustee respondents by school location**

Location	Principals %	Trustees %	Sampling frame schools %
Metropolitan	53	49	50
Small city	7	11	5
Town	11	11	11
Rural	30	29	34

Teachers

The following tables show how the achieved sample of teachers compares with school roll numbers in the sampling frame, by decile band, school size and school location.

The number of teachers in a school is roughly proportional to the number of students in the same school. However, as school roll varies for each school, we cannot expect the number of teachers distributed across decile, size and location to be the same as the way schools are distributed.

There is a reasonable representation of teachers across school decile, size and location, compared to the distribution of students across these variables.

TABLE 9 **Teacher respondents by school decile band**

Decile band	Teachers %	School roll %
1–2	16	18
3–4	17	18
5–6	17	17
7–8	24	21
9–10	27	26

TABLE 10 **Teacher respondents by school size**

Size	Teachers %	School roll %
Small	10	7
Small–medium	19	17
Medium–large	27	27
Large	45	49

TABLE 11 **Teacher respondents by school location**

Location	Teachers %	School roll %
Metropolitan	70	72
Small city	8	6
Town	10	9
Rural	13	12

Parents and whānau

The parent and whānau sample is not random and therefore not expected to be representative of the primary and intermediate schools in our sampling frame. Responses from parents apply only to the schools surveyed. The aim of the parent school selection process is to select schools across a range of school decile and size groups in order to gather parent opinions from different school contexts.

Although we sent parent and whānau questionnaires to the 36 schools that had agreed to distribute the questionnaires, we received completed surveys from parents with children at only 31 of these schools. This resulted in our final sample varying somewhat from the school decile and size characteristics of the whole sample frame.

Similarly to teachers, we compare the distribution of parent and whānau respondents to the numbers of students in the sampling frame by school decile band, size and location.

There are fewer parent respondents from deciles 9 and 10, and more from deciles 5 to 8, compared to the distribution of students across school decile. There are more parent respondents from large schools and fewer from medium–large schools, compared to the distribution of students. There are fewer parent respondents from metropolitan areas and more from small cities and towns than we would expect from looking at the distribution of school roll.

TABLE 12 **Parent respondents by school decile band**

Decile band	Parents %	School roll %
1–2	16	18
3–4	18	18
5–6	23	17
7–8	26	21
9–10	18	26

TABLE 13 **Parent respondents by school size**

Size	Parents %	School roll %
Small	10	7
Small–medium	16	17
Medium–large	33	27
Large	41	49

TABLE 14 **Parent respondents by school location**

Location	Parents %	School roll %
Metropolitan	40	72
Small city	20	6
Town	26	9
Rural	13	12

Respondent characteristics

Tables 15 to 18 give some demographic information about the individual teachers, principals, trustees and parents and whānau who were involved in the national survey.

TABLE 15 **Teacher respondent characteristics**

Characteristic	Category	*n*	%
Years teaching	Less than 2 years	55	7
	3–5 years	105	14
	6–10 years	128	17
	11–15 years	132	17
	More than 15 years	349	45
Age	Under 30	112	15
	30–39	164	21
	40–49	231	30
	50–59	170	22
	60–64	68	9
	65 and over	18	2
Gender	Female	679	88
	Male	85	11
	Gender diverse	1	0
Ethnicity	NZ European/Pākehā	655	85
	Māori	77	10
	Samoan, Tongan, Cook Island Māori, Niuean	24	3
	Chinese	1	0
	Indian	11	1
	Other	63	8

TABLE 16 **Principal respondent characteristics**

Characteristic	Category	*n*	%
Years as a principal	0–3 years	35	18
	3–5 years	24	12
	6–10 years	41	21
	11–15 years	37	19
	More than 15 years	62	31
Age	Under 40	17	9
	40–49	62	31
	50–59	65	33
	60–64	44	22
	65 and over	9	5
Gender	Female	118	59
	Male	79	40
Ethnicity	NZ European/Pākehā	175	88
	Māori	24	12
	Samoan, Tongan, Cook Island Māori, Niuean	2	1
	Chinese	1	1
	Indian	0	0
	Other	4	2

TABLE 17 **Trustee respondent characteristics**

Characteristic	Category	n	%
Board chair	Yes	108	61
	No	67	38
Age	Under 30	3	2
	30–39	40	23
	40–49	98	56
	50–59	27	15
	60–64	3	2
	65 and over	5	3
Gender	Female	89	51
	Male	87	49
Ethnicity	NZ European/Pākehā	148	84
	Māori	23	13
	Samoan, Tongan, Cook Island Māori, Niuean	7	4
	Chinese	3	2
	Indian	1	1
	Other	10	6
Highest qualification	No qualification	11	6
	Secondary school qualification (incl. overseas) and UE	35	20
	NZQA L4, trade cert., diploma	24	14
	Bachelor's, grad dip./cert.	49	28
	Honours, postgrad dip./cert.	25	14
	Master's degree or PhD	24	14
	Other	2	1

TABLE 18 **Parent respondent characteristics**

Characteristic	Category	n	%
Age	Under 30	27	5
	30–39	180	36
	40–49	246	49
	50–59	44	9
	60–64	2	0
	65 or over	2	0
Gender	Female	438	87
	Male	61	12
Ethnicity	NZ European/Pākehā	414	82
	Māori	96	19
	Samoan, Tongan, Cook Island Māori, Niuean	15	3
	Chinese	7	1
	Indian	12	2
	Other	40	8
Highest qualification	No qualification	38	8
	Secondary school qualification (incl. overseas) and UE	163	32
	NZQA L4, trade cert., diploma	97	19
	Bachelor's, grad dip./cert.	116	23
	Honours, postgrad dip./cert.	43	9
	Master's degree or PhD	19	4
	Other	16	3

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