

# *My School* does not make fair comparisons of school NAPLAN data

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## Summary

The *My School* website purports to provide a fair comparison of the performance of each school in NAPLAN against other schools ‘with students from statistically similar backgrounds’. Each school’s NAPLAN score is judged to be ‘substantially above’, ‘above’, ‘close to’, ‘below’ or ‘substantially below’ those ‘similar schools’.

Yet these comparisons contain a major flaw. They fail to take into account the cultural/language background of students in schools (indicated by the main language spoken in the student’s home).

There is an abundance of research, spanning many countries, which shows student cultural/language background impacts educational outcomes. In this paper, the CECV presents data for Catholic school students in Victoria that confirms the same patterns in NAPLAN. On average, after taking into account other key factors, students from some cultural/language backgrounds (e.g. where a Chinese or Mon-Khmer language is spoken at home) perform better in NAPLAN than other students, especially in Numeracy. The data further shows students from other cultural/language backgrounds (e.g. where an African or Australian Indigenous language is spoken at home) tend to score worse.

Given these differences, it is misleading and unfair to directly compare the NAPLAN results of schools that have students from different cultural/language backgrounds.

This is not merely a theoretical argument. Schools that are deemed on *My School* to have ‘students from statistically similar backgrounds’ can have large differences in students from different cultural/language backgrounds. This report provides two examples where comparisons of school NAPLAN data are skewed by the failure to take into account student cultural/language background. These examples are students with Mon-Khmer cultural/language background in Catholic schools, and students with Chinese cultural/language background in government primary schools. In both cases, the relevant schools are compared on *My School* to other schools that lack these students, and are assessed to out-perform them. These ratings are almost certainly due to shortcomings in the methodology for comparing schools, rather than school performance.

Comparisons of school NAPLAN data on *My School* must be refined, to take into account student cultural/language background. If it is not possible to properly identify schools that are ‘statistically similar’ then comparisons of ‘like’ schools on *My School* should be removed. Less school data would be better than misleading data.

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## 1. Introduction

In this report, the Catholic Education Commission of Victoria (CECV) highlights a major problem with the reporting of school NAPLAN data on the *My School* website.

This problem need to be addressed urgently, given that *My School* has become a key source of information for parents and the community on school performance.<sup>1</sup>

*My School* reports school mean scores in NAPLAN, and student gain in NAPLAN.

For school mean NAPLAN scores, *My School* purports to show how each school compares to up to 60 schools 'with students from statistically similar backgrounds'. These schools are called 'similar schools'. Each school's score is judged to be 'substantially above', 'above', 'close to', 'below' or 'substantially below' those 'similar schools'.

Similarly, for each school, *My School* reports student gain over time in NAPLAN tests compared to 'similar schools' and compared to students with the same starting scores.

ACARA assures parents that these assessments are 'fair'.<sup>2</sup>

But ACARA is wrong in many instances and the comparisons on the *My School* website are flawed because they do not compare like-with-like. This report explains why. It proceeds as follows:

- Section 2 details linkages between student cultural/language background and student academic performance (including in NAPLAN)
- Section 3 shows how this link causes *My School* to present misleading data about school performance in NAPLAN
- Section 4 suggests some next steps.

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<sup>1</sup> ACARA research indicates that one-third of parents use *My School*, especially to see how their child's school is performing in NAPLAN. Colmar Brunton 2018, *ACARA NAPLAN research*, February. See <https://acaraweb.blob.core.windows.net/acaraweb/docs/default-source/assessment-and-reporting-publications/2018-naplan-online-parent-research.pdf?sfvrsn=2>

<sup>2</sup> <https://www.myschool.edu.au/more-information/information-for-parents/>

## 2. Student cultural/language background and academic achievement

This section briefly summarises research on the link between student cultural/language background and academic achievement (section 2.1). It then presents new research on the link between student cultural/language background and student performance in NAPLAN for Catholic schools in Victoria (section 2.2).

### 2.1 Research shows that student cultural/language background impacts achievement

There is an abundance of research demonstrating that student cultural/language background is an important factor in academic achievement. Students from different cultural/language backgrounds can have vastly different levels of achievement.

A small selection of this research (from Australia, the United States and England) is summarised below.

- It has been shown that second-generation East Asian immigrants outperform their native Australian peers in mathematics by more than 100 PISA test points – the equivalent of two and a half years of schooling.<sup>3</sup>
- It has been shown that first-generation and second-generation immigrant students from China, India and the Philippines are more likely to achieve baseline academic proficiency than native Australian students.<sup>4</sup>
- Average Composite scores for American College Testing (ACT) are much higher for Asian students than other students. For example, in 2018, the Average Composite ACT score for Asian students was more than two points higher than the next-highest racial group (White students). Conversely, the scores of Black and Native American students were lower than other racial groups.<sup>5</sup>
- In key stage 4 attainment in England, Chinese pupils are identified as the highest attaining ethnic group. In 2012-13, for example, 78 per cent of ethnic Chinese children obtained at least 5 A\* to C General Certificate of Secondary Education (GCSE) grades, compared to a national average of just 60 per cent.<sup>6</sup>
- A comprehensive study on the education progress of students in England found consistent differences between ethnic groups in achievement. The performance of

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<sup>3</sup> John Jerrim (2015) *Why do East Asian children perform so well in PISA? An investigation of Western-born children of East Asian descent*, Oxford Review of Education, 41:3, 310-333

<sup>4</sup> OECD (2018), *The resilience of students with an immigrant background: Factors that shape well-being*, OECD Publishing, Paris

<sup>5</sup> See <https://www.insidehighered.com/admissions/article/2018/10/22/act-scores-drop-only-asian-americans-saw-gains>

<sup>6</sup> Department for Education (2014) *Statistical First Release – GCSE and equivalent attainment by pupil characteristics in England, 2012/13*, London

Black Caribbean, Black African, Black Other, Pakistani, and Bangladeshi groups was below that of their White British peers, while Chinese, Indian, and Irish pupils scored higher than White British students.<sup>7</sup>

These types of differences occur even after adjustments for other student characteristics, such as parental education and occupation levels. Such is the strength and consistency of these findings that, in recent decades, the research has shifted to focus on explaining the differences. A range of reasons have been put forward. It has been argued:<sup>8</sup>

- Students from certain migrant backgrounds have higher educational aspirations and expectations than non-migrant students. For example, in Australia, the proportion of East Asian immigrant students that expect to go to university is much higher than the proportion of native Australians<sup>9</sup>
- Students from certain cultural backgrounds place a higher value on education – e.g. students from Confucian (East Asian) cultures and countries like India
- Advantaged-LBOTE students are more likely to focus on their learning and educational achievement, including by receiving out-of-school tutoring and spending more time on homework. East Asian immigrant students have reported that they spend more time studying after school than native Australian teenagers<sup>10</sup>
- The cognitive benefits of learning an additional language could help boost LBOTE students' performance compared with their monolingual peers.
- Australia's skilled migration program could be filtering migrant families so that those who are accepted into Australia are likely to have greater academic proficiency.

Conversely, student language spoken at home can be a signal of disadvantage beyond student socio-educational advantage or English proficiency. For example, many students in Australia from an African language background may be refugees and therefore face additional educational challenges. Research in psychology and education suggests that trauma is associated with poorer educational outcomes.<sup>11</sup>

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<sup>7</sup> Steve Strand (2010) *Do some schools narrow the gap? Differential school effectiveness by ethnicity, gender, poverty, and prior achievement*, School Effectiveness and School Improvement, 21:3, 289-314

<sup>8</sup> For example, see Julie Sonnemann, 'Children of migrant families do better at school – and we need to find out why', *Australian Financial Review*, 8 July 2018 and Justine Dandy, 'Why some migrant school students do better than their local peers (they're not 'just smarter')', *The Conversation*, 3 April 2018.

<sup>9</sup> Of the students who sat PISA in 2012 in Australia, 94% of East Asian immigrant students expected to go on to university, compared with 58% of the native Australians. John Jerrim (2015) *Why do East Asian children perform so well in PISA? An investigation of Western-born children of East Asian descent*, Oxford Review of Education, 41:3, 310-333

<sup>10</sup> Of the students who sat PISA in 2012 in Australia, East Asian immigrant students stated they spend 15 hours per week studying out-of-school, compared to 9 hours per week for native Australian students. John Jerrim (2015) *Why do East Asian children perform so well in PISA? An investigation of Western-born children of East Asian descent*, Oxford Review of Education, 41:3, 310-333

<sup>11</sup> Tobin, Mollie, "Childhood trauma: Developmental pathways and implications for the classroom" (2016). See [https://research.acer.edu.au/learning\\_processes/20](https://research.acer.edu.au/learning_processes/20)

Notably, all of these explanations relate to the particular characteristics of LBOTE students and their families and/or the particular circumstances they face. They have nothing to do with the schools they attend. There is no evidence to suggest that differences in the achievement of advantaged-LBOTE and disadvantaged-LBOTE students is due to ‘school effects’.

## 2.2 CECV data also highlights the importance of student cultural/language background

The CECV has performed statistical analysis of NAPLAN data for students in Catholic schools in Victoria, to test whether the findings reported above also apply to NAPLAN. The analysis uses student results in 2017 and 2018 for Numeracy and Reading. Two aspects of student NAPLAN performance are considered – achievement (i.e. NAPLAN score) and gain (i.e. increase in NAPLAN score between two successive tests).

The analysis assesses how student performance in NAPLAN varies with student cultural/language background, while also taking into account other important student and school characteristics. Those other characteristics have been chosen to align with the factors used on the *My School* website to compare school NAPLAN data. This targeted approach is designed to test whether student cultural/language background may distort school comparisons on *My School*.

The results of the analysis are summarised below, and presented in detail in Appendix A.

### Student NAPLAN scores

#### ‘Similar students’

*My School* allows school mean scores in NAPLAN to be compared against ‘schools with similar students’. It deems schools to be ‘similar’ based on parental education and occupation characteristics of students, Aboriginal and Torres Strait Islander (ATSI) students and school location. These are the factors used to construct school ICSEA values (see section 3.1).

After taking into account these characteristics, LBOTE students overall tend to achieve slightly higher NAPLAN scores in Numeracy and slightly lower NAPLAN scores in Reading (refer to Equation 1 in Tables A5-A8 in Appendix A). Yet the overall impacts are small and, in some cases, not statistically significant (i.e. may be due to chance).

After disaggregating LBOTE students into a combination of 2-digit and 3-digit language background classifications used by the Australian Bureau of Statistics, the statistical link between students from certain cultural/language backgrounds and their NAPLAN scores becomes much larger. Indeed, some of the differences are very large.

Table 1 shows differences in average NAPLAN Numeracy scores for various LBOTE students, compared to non-LBOTE students, in 2018. On average:

- The effect of a Chinese language background is positive 43-65 points
- The effect of another Eastern Asian language (e.g. Japanese, Korean) background is positive 31-60 points

- The effect of a Mon-Khmer language (e.g. Vietnamese) background is positive 33-55 points
- The effect of a Southern Asian language (e.g. Hindi, Marathi) background is positive 13-27 points
- The effect of an African language background is negative 29-37 points
- The effect of an Other language (e.g. a Polynesian or Australian Indigenous language) background is negative 21-40 points.
- The effect of a Southern European language (e.g. Greek, Italian, or Spanish) background is negative 6-17 points.

The findings using 2017 data (shown in Appendix A) are very similar.

**Table 1: Statistical link between student NAPLAN scores in Numeracy and student cultural/language background (2018) – after adjusting for factors used in ICSEA values**

Scaled score for Numeracy	Year 3	Year 5	Year 7	Year 9
<b>Main language spoken at home</b>				
African	-32.3***	-29.4***	-37.4***	-32.6***
Chinese	42.7***	61.3***	64.6***	49.5***
Eastern Asian (excl Chinese)	31.1***	60.4***	41.0***	36.5***
Eastern European	-4.0	-2.8	-1.9	-0.5
Mon-Khmer	33.1***	44.0***	55.1***	42.7***
Northern European (excl English)	8.4	15.3**	7.6	17.5**
Other	-20.9***	-28.8***	-39.8***	-31.8***
Southeast Asian (excl Mon-Khmer)	12.9***	13.4***	8.2**	10.8***
Southern Asian	13.1***	26.6***	24.8***	16.8***
Southern European	-12.5***	-5.9***	-13.0***	-16.6***
Southwest & Central Asian	-16.5***	-14.0***	-16.0***	-13.8***

*The numbers in the table are estimates of the average difference in NAPLAN scores between students from the identified LBOTE category and non-LBOTE students, after adjusting for parental education and occupation characteristics of students and their peers, student Indigenous status and school location.*

*\*Significant at 90% level ( $p < 0.1$ ), \*\*Significant at 95% level ( $p < 0.05$ ), \*\*\*Significant at 99% level ( $p < 0.99$ )*

*Further details on the regression analysis are provided in Appendix A*

*Source: CECV analysis and 2017 and 2018 NAPLAN data for students in CECV schools*

The effects of student cultural/language background are similar but smaller for Reading. Table 2 shows the differences in average NAPLAN Reading scores for various LBOTE students, compared to non-LBOTE students, in 2018. On average:

- The effect of a Chinese language background is positive 16-31 points
- The effect of a Mon-Khmer language (e.g. Vietnamese) background is positive 18-31 points



- The effect of a Southern Asian language (e.g. Hindi, Marathi) background is positive 7-13 points
- The effect of an African language background is negative 27-38 points
- The effect of an Other language (e.g. a Polynesian or Australian Indigenous language) background is negative 14-35 points
- The effect of a Southern European language (e.g. Italian, Greek, Spanish) background is negative 9-16 points
- The effect of a Southwest and Central Asian language (e.g. Arabic) background is negative 22-28 points.

The findings for 2017 data (shown in Appendix A) are similar.

**Table 2: Statistical link between student NAPLAN scores in Reading and student cultural/language background (2018) – after adjusting for factors used in ICSEA values**

Scaled score for Reading	Year 3	Year 5	Year 7	Year 9
<b>Main language spoken at home</b>				
African	-26.8***	-37.7***	-38.2***	-29.4***
Chinese	29.4***	31.1***	30.9***	15.6***
Eastern Asian (excl Chinese)	1.6	34.3***	13.2	19.6*
Eastern European	-4.5	-8.8**	-4.4	-4.3
Mon-Khmer	18.2***	27.4***	31.1***	18.6***
Northern European (excl English)	0.7	16.1*	0.4	15.4**
Other	-14.0	-29.0***	-35.4***	-16.8**
Southeast Asian (excl Mon-Khmer)	16.7***	12.8***	13.6***	17.1***
Southern Asian	11.6***	13.4***	11.3***	6.7**
Southern European	-15.5***	-10.4***	-9.0***	-10.2***
Southwest & Central Asian	-26.6***	-28.2***	-27.7***	-21.9***

*The numbers in the table are estimates of the average difference in NAPLAN scores between students from the identified LBOTE category and non-LBOTE students, after adjusting for parental education and occupation characteristics of students and their peers, student Indigenous status and school location.*

*\*Significant at 90% level ( $p < 0.1$ ), \*\*Significant at 95% level ( $p < 0.05$ ), \*\*\*Significant at 99% level ( $p < 0.99$ )*

*Further details on the regression analysis are provided in Appendix A*

*Source: CECV analysis and 2017 and 2018 NAPLAN data for students in CECV schools*

The analysis shows that aggregation of all LBOTE students into a single group masks major differences in NAPLAN scores between different LBOTE groups. These groups comprise both educationally-advantaged LBOTE students (e.g. students with Chinese or Mon-Khmer cultural/language background) and educationally-disadvantaged LBOTE students (e.g. students with an African cultural/language background).

The effect of student cultural/language background for different LBOTE groups can be large. In some cases the link between cultural/language background and student

NAPLAN scores is stronger than the link between student socioeconomic status (measured by the 'disadvantaged' variable) and NAPLAN scores.

### Student gain in NAPLAN

#### 'Similar students'

The *My School* website allows student gain in NAPLAN in a school to be compared against 'schools with similar students' (which are identified as described earlier). After taking these into account, LBOTE students overall tend to achieve slightly higher gains in NAPLAN Numeracy and Reading than non-LBOTE students (refer to Equation 1 in Tables A9 and A10 in Appendix A). Yet the overall impacts are modest and, in some cases, not statistically significant.

When LBOTE students are disaggregated into various LBOTE groups (Table 3), there is little consistency in effects across year levels and domains.

**Table 3: Statistical link between student gain in NAPLAN and student cultural/language background (2016 to 2018) – after adjusting for factors used in ICSEA values**

Student gain	Year 3-5 Numeracy	Year 7-9 Numeracy	Year 3-5 Reading	Year 7-9 Reading
<b>Main language spoken at home</b>				
African	8.3***	5.7**	11.6***	3.1
Chinese	16.2***	3.0	9.5**	15.2***
Eastern Asian (excl Chinese)	3.8	-4.8	-15.1	-8.8
Eastern European	7.4***	1.3	-2.6	5.4**
Mon-Khmer	13.1***	3.5**	9.5***	13.6***
Northern European (excl English)	-7.0	3.1	6.5	-0.4
Other	10.6*	-5.2	-5.9	20.3***
Southeast Asian (excl Mon-Khmer)	6.5***	5.4***	-3.4	12.0***
Southern Asian	14.6***	1.5	6.8**	9.1***
Southern European	5.9***	-0.2	1.0	4.7***
Southwest & Central Asian	5.1**	0.5	-0.7	4.8**

*The numbers in the table are estimates of the average difference in NAPLAN gain between students from the identified LBOTE category and non-LBOTE students, after adjusting for parental education and occupation characteristics of students and their peers, student Indigenous status and school location.*

*\*Significant at 90% level ( $p < 0.1$ ), \*\*Significant at 95% level ( $p < 0.05$ ), \*\*\*Significant at 99% level ( $p < 0.99$ )*

*Further details on the regression analysis are provided in Appendix A*

*Source: CECV analysis and 2017 and 2018 NAPLAN data for students in CECV schools*

#### 'Same starting scores'

The *My School* website also allows student gain in NAPLAN in a school to be compared against 'students with the same starting scores'. After taking into account student starting scores, LBOTE students overall tend to achieve slightly higher gains in Numeracy and Reading than non-LBOTE students (refer to Equation 1 in Tables A11 and A12 in

Appendix A). Yet the overall impacts are modest, can be mixed and can also not be statistically significant.

When LBOTE students are disaggregated into meaningful language background groups, however, the statistical link between students from certain cultural/language backgrounds and their gain in NAPLAN becomes larger. Table 4 shows the differences in NAPLAN gain in Numeracy and Reading from 2016 to 2018 for various groups of LBOTE students, compared to non-LBOTE students, after adjusting for student starting scores.

**Table 4: Statistical link between student gain in NAPLAN and student cultural/language background (2016 to 2018) – after adjusting for student starting scores**

Student gain	Year 3-5 Numeracy	Year 7-9 Numeracy	Year 3-5 Reading	Year 7-9 Reading
<b>Main language spoken at home</b>				
African	-9.1***	-3.1	-10.6***	-7.9***
Chinese	32.3***	11.7***	16.2***	16.5***
Eastern Asian (excl Chinese)	27.3***	2.2	-0.1	2.5
Eastern European	3.4	0.5	-6.1**	3.4
Mon-Khmer	19.1***	9.5***	7.9***	13.6***
Northern European (excl English)	2.6	5.7	10.9*	4.1
Other	-8.2*	-12.3***	-18.6***	5.8
Southeast Asian (excl Mon-Khmer)	8.2***	6.3***	0.6	13.1***
Southern Asian	18.5***	4.2**	7.9***	8.9***
Southern European	2.1*	-3.2***	-3.2*	1.1
Southwest & Central Asian	-8.1***	-4.5**	-18.8***	-3.4

*The numbers in the table are estimates of the average difference in NAPLAN gain between students from the identified LBOTE category and non-LBOTE students, after adjusting for student starting score. \*Significant at 90% level ( $p < 0.1$ ), \*\*Significant at 95% level ( $p < 0.05$ ), \*\*\*Significant at 99% level ( $p < 0.99$ ) Further details on the regression analysis are provided in Appendix A*

*Source: CECV analysis and 2017 and 2018 NAPLAN data for students in CECV schools*

On average:

- The effect of a Chinese language background is positive 12-32 points
- The effect of a Mon-Khmer language (e.g. Vietnamese) background is positive 8-19 points
- The effect of a Southern Asian language (e.g. Hindi, Marathi) background is positive 4-19 points
- The effect of an African language background is negative 3-11 points (although the coefficient for Year 7-9 Numeracy in 2018 is not statistically significant).

The findings for 2017 data (shown in Appendix A) are similar.

As was the case with student scores in NAPLAN:

- Aggregation of all LBOTE students in a single group mask major differences in student gain in NAPLAN between different LBOTE groups given their starting score
- The key groups who have above-average performance include students with Chinese, Mon-Khmer and Southern Asian cultural/language backgrounds
- A key group that has below-average performance include students with an African cultural/language background.

The effect size<sup>12</sup> of student cultural/language on student NAPLAN gain (usually less than 0.4 standard deviations) is less than its effect size on student NAPLAN scores (where it can exceed one standard deviation).<sup>13</sup>

### Summary

NAPLAN data for Catholic schools in Victoria confirms other research that shows student cultural/language background impacts academic outcomes.

On average, after taking into account other key factors, students from some cultural/language backgrounds (e.g. where a Chinese or Mon-Khmer language is spoken at home) perform better in NAPLAN than other students, especially in Numeracy. The data further shows students from other cultural/language backgrounds (e.g. where an African or Australian Indigenous language is spoken at home) tend to score worse. The effects are larger and more widespread for student *achievement* in NAPLAN than student *gain* in NAPLAN.

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<sup>12</sup> In a regression equation, the effect size is the coefficient of the independent variable divided by the standard deviation of the dependent variable.

<sup>13</sup> These estimates are net of factors used on the *My School* website to contextualise school data (student starting score for student gain and ICSEA factors for student NAPLAN scores).

### 3. *My School* does not make ‘fair’ comparisons of school NAPLAN data

Building on section 2, this section shows how the *My School* website can present misleading comparisons of school performance in NAPLAN. This occurs because student cultural/language background is not factored into school ICSEA values (section 3.1), but the cultural/language background of students can differ significantly between schools (section 3.2). Section 3.3 then provides examples where *My School* is most misleading.

#### 3.1 Student cultural/language background is not factored into school ICSEA values

School ICSEA values<sup>14</sup> are one of the most abused measures in education. They are not a valid measure of school resource needs.<sup>15</sup> Nor is it valid to compare school funding levels based on ICSEA values.<sup>16</sup> Where this is done, the comparisons have almost always been cherry-picked to produce a desired outcome.

Rather, school ICSEA values purport to provide an indication of the average level of educational advantage of students attending each school. ICSEA values are constructed from the following school and student factors: parents’ occupation and education; school location; and school proportion of Indigenous students.

These factors do not include the cultural/language background of students at the school – even though, as shown in Section 2, there can be a strong statistical link between this attribute and student performance in NAPLAN.

ICSEA scores are used by ACARA on *My School* to compare school results in NAPLAN. A recent survey indicates that one-third of parents use *My School*, especially to see how their child’s school is performing in NAPLAN.<sup>17</sup>

ACARA advises parents that ‘*My School* lets you make fair comparisons of schools...we have developed a scale to let you compare similar schools fairly. The scale is called ICSEA.’<sup>18</sup> Similarly, ACARA tells principals that ‘ICSEA lets us compare schools fairly’

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<sup>14</sup> ICSEA refers to the Index of Community Socio-Educational Advantage. See <https://www.myschool.edu.au/more-information/information-for-principals-and-teachers/icsea-for-principals/>

<sup>15</sup> ICSEA scores do not even include the main driver of school resource needs (in per-student terms), which is school size. Nor do they include school enrolments of students with disability. Moreover the factors that are included in ICSEA values have been calibrated to model school performance in NAPLAN tests, not school funding requirements.

<sup>16</sup> A recent example of this type of flawed analysis was recently published by the ABC (*Counting the cost of the education revolution*).

<sup>17</sup> Colmar Brunton 2018, *ACARA NAPLAN research*, February. See <https://acaraweb.blob.core.windows.net/acaraweb/docs/default-source/assessment-and-reporting-publications/2018-naplan-online-parent-research.pdf?sfvrsn=2>

<sup>18</sup> <https://www.myschool.edu.au/more-information/information-for-parents/>

because 'schools with students who have similar levels of educational advantage will have similar ICSEA values'.<sup>19</sup>

Yet the omission of student cultural/language background from ICSEA values contradicts these claims.

If schools have different enrolments of students from advantaged-LBOTE and disadvantaged-LBOTE backgrounds, then ICSEA values do not allow a 'fair' comparison of schools. Where this occurs, contrary to the claims of ACARA, schools with similar ICSEA values do not actually have 'similar levels of educational advantage'.

To what extent does this currently impact comparisons of school NAPLAN data on *My School*? This depends on the extent that schools with similar ICSEA scores actually have differences in enrolment of advantaged-LBOTE and disadvantaged-LBOTE students. This is examined in section 3.2.

### 3.2 Student cultural/language background can differ significantly between schools

At first glance, it appears that student cultural/language background may be unlikely to have a material impact on comparisons of school NAPLAN data on *My School*.

This is because overall enrolments of advantaged-LBOTE and disadvantaged-LBOTE students in Australian schools are relatively modest. For example, only 3% of students in Australia have a Chinese cultural/language background (i.e. the main language spoken at home is a Chinese language), while only 1.4% of students have a Mon-Khmer cultural/language background and 0.7% of students have an African cultural/language background.<sup>20</sup> This suggests the effect of cultural/language background may be diluted, or the effects for different students may offset within schools.

Yet average figures obscure the uneven distribution of LBOTE groups across Australia and thus schools. Families with similar cultural/language backgrounds tend to cluster (Table 5). For example, 24 per cent of all students with Chinese cultural/language background live in just 30 suburbs in Australia (or 0.2% of all suburbs). Similarly, 40 per cent of students with Mon-Khmer cultural/language background live in just 30 suburbs. Almost all of the suburbs where advantaged LBOTE groups cluster are in New South Wales and Victoria.

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<sup>19</sup> <https://www.myschool.edu.au/more-information/information-for-principals-and-teachers/icsea-for-principals/>

<sup>20</sup> Australian Bureau of Statistics, Census of Population and Housing, 2016 Table Builder

**Table 5: Geographic concentration of selected LBOTE students, 2016**

	Chinese language spoken at home	Mon-Khmer language spoken at home	African language spoken at home
Total students attending a primary or secondary school	96,720	47,964	22,303
Students in the highest 30 suburbs (%)	24	40	26
Students in the highest 50 suburbs (%)	32	49	35

*'Highest' refers to the suburbs with the highest numbers of students from each language background.*

*Note: There are close to 15,300 suburbs in Australia*

*Source: Australian Bureau of Statistics, Census of Population and Housing, 2016, Table Builder*

Advantaged- and disadvantaged-LBOTE students are highly concentrated in the schools in these locations – especially primary schools (which have smaller catchments). In some cases, they are also concentrated in certain school sectors while avoiding others. Students with Chinese cultural/language background are less than *half* as likely to enrol in a Catholic school as other types of students (Table 6). In contrast, students with a Mon-Khmer cultural/language background are more likely to enrol in a Catholic school.

**Table 6: Sector shares of selected LBOTE students, 2016**

	Government schools	Catholic schools
Share of all students (%)	64	21
Share of students – Chinese language spoken at home (%)	72	10
Share of students – Mon-Khmer language spoken at home (%)	67	28
Share of students – African language spoken at home (%)	57	24

*Source: Australian Bureau of Statistics, Census of Population and Housing, 2016, Table Builder*

Together, geographic and school sector patterns in enrolments of advantaged- and disadvantaged-LBOTE students can greatly impact comparisons of school NAPLAN data on *My School*.

This is shown in the examples presented in section 3.3.

### 3.3 Examples of unfair comparisons of school NAPLAN data on *My School*

#### **Students with Mon-Khmer cultural/language background**

CECV analysis shows that students with Mon-Khmer cultural/language background tend to achieve higher scores in NAPLAN Numeracy than other students, after adjusting for other factors used in ICSEA values.

This implies that schools with many students with Mon-Khmer cultural/language background are likely to receive favourable ratings in NAPLAN Numeracy on the *My School* website, when their mean NAPLAN scores are compared against 'like' schools.

This certainly appears to be the case. Table 7 lists the CECV schools with the most students with Mon-Khmer cultural/language background. It also provides other information including how *My School* rates their mean NAPLAN scores in 2017 in Numeracy<sup>21</sup> against 'like' schools for Year 3 and Year 5 students.

**Table 7: CECV schools with the most students with Mon-Khmer cultural/language background (2017)**

School	Suburb	Mon-Khmer language spoken at home (%)*	ICSEA	Rating of school mean NAPLAN score against 'like' schools (Numeracy, 2017)	
				Year 3	Year 5
St Joseph's School	Springvale	84	988	Above	Substantially Above
St Monica's School	Footscray	67	1044	Close to	Close to
St Bernadette's School	Sunshine North	66	944	Above	Substantially Above
Christ the King School	Braybrook	64	995	Close to	Above
Holy Eucharist School	St Albans South	59	977	Above	Substantially Above

\*Percentage is calculated from students who participated in NAPLAN testing in 2017

Source: Australian Bureau of Statistics, *Census of Population and Housing, 2016, Table Builder*

Four of the five schools were rated to perform 'above' or 'substantially above' 'like' schools in at least one of Year 3 or Year 5 Numeracy in 2017. Notably, the only school that did not receive one of these ratings also has material enrolments of disadvantaged-LBOTE students.<sup>22</sup> None of the schools were rated 'below' 'like' schools. Altogether, of the ten ratings, seven are either 'above' or 'substantially above'. If St Monica's School is excluded<sup>23</sup> then seven of eight ratings are either 'above' or 'substantially above'.

*My School* deems these schools to be very strong performers in NAPLAN Numeracy compared to 'like' schools. The main reason this probably occurs is because students with Mon-Khmer cultural/language background are skewing the comparisons and *My School* is not comparing like-with-like.

### **Students with Chinese cultural/language background**

Students with Chinese cultural/language background are highly likely to distort comparisons of school NAPLAN data on *My School* because:

- There is a relatively large number of these students in total (almost 100,000)
- On average, these students perform much better than other students in NAPLAN, especially in Numeracy (see section 2)
- These students are highly concentrated in certain schools.

<sup>21</sup> As shown in Section 2, the educational advantage of students with Mon-Khmer cultural/language background appears to be strongest in NAPLAN Numeracy.

<sup>22</sup> Ten percent of students who sat NAPLAN in 2017 at St Monica's School had an African language background.

<sup>23</sup> See footnote above.



This can be demonstrated by identifying the schools with the most students with Chinese cultural/language background, and reviewing the NAPLAN data for these schools on *My School*. Many of these schools are in the government sector.

Table 8 lists government primary schools estimated to have very high enrolments of students with Chinese cultural/language background.<sup>24</sup> Table 8 also provides other information including school ICSEA value, LBOTE enrolments and how *My School* rates their NAPLAN performance in 2017 in Numeracy<sup>25</sup> against 'like' schools for Year 3 and Year 5 students.

**Table 8: Government primary schools with many students with Chinese cultural/language background, 2017**

Government school	State	ICSEA value	LBOTE (%)	Rating versus 'like' schools (Numeracy, 2017)	
				Year 3	Year 5
Mount View Primary School	VIC	1155	84	Above	Above
Carlingford Public School	NSW	1122	79	Above	Close to
Hurstville Public School	NSW	1100	97	Substantially Above	Substantially Above
Beverly Hills Primary School	VIC	1147	89	Substantially Above	Substantially Above
Epping Public School	NSW	1162	84	Above	Above
Chatswood Public School	NSW	1164	85	Above	Substantially Above
Crestwood Public School	NSW	1122	50	Above	Close to
Denistone East Public School	NSW	1150	77	Substantially Above	Close to
Campsie Public School	NSW	1018	97	Above	Above
Castle Hill Public School	NSW	1120	63	Close to	Close to
Pinewood Primary School	VIC	1144	66	Above	Above
Balwyn North Primary School	VIC	1150	76	Above	Substantially Above
Alamanda K-9 College	VIC	1098	66	Above	Close to
Willetton Primary School	WA	1125	52	Close to	Above
Hornsby North Public School	NSW	1150	62	Above	Substantially Above
Ranford Primary School	WA	1102	47	Close to	Above
Sunnybank Hills State School	QLD	1111	69	Above	Substantially Above
Doncaster Gardens	VIC	1150	81	Above	Substantially Above
John Purchase Public School	NSW	1152	69	Above	Above

Source: ACARA *My School* website

<sup>24</sup> Unfortunately, data on language spoken at home is not publicly available for government schools, so these schools have been identified using a method that is most reliable for primary schools. This method is described in Appendix B.

<sup>25</sup> As shown in Section 2, the educational advantage of students with Chinese language background appears to be strongest in NAPLAN Numeracy.

The ratings received by these schools in Numeracy are extraordinary:

- 10 of the 38 ratings are 'substantially above', while a further 20 ratings are 'above'
- 18 of the 38 schools receive at least one rating of 'above' or 'substantially above'
- None of the schools receive a rating of 'below' or 'substantially below'.

Crucially, the schools have a narrow band of ICSEA values. Seventeen of the 19 schools have ICSEA values between 1100 and 1170.

As earlier, *My School* deems these schools to be very strong performers in NAPLAN Numeracy compared to 'like' schools. The main reason these schools are achieving this rating is probably because these schools are compared to other schools with much fewer enrolments of advantaged-LBOTE students. The comparison is not like-with-like.

The distortion extends beyond the schools shown in Table 8. Altogether, there are over 100 government primary schools, with ICSEA values between 1100 and 1170, and LBOTE enrolments of 50% or above. Many of the LBOTE students in these schools are students with Chinese cultural/language background.

The *My School* website does not just present an artificially positive portrayal of these schools. It also presents an unfair, negative portrayal of schools whose NAPLAN results are compared against these schools, but which have few enrolments of students from advantaged cultural/language background groups.

Many of the schools that are disadvantaged by these flawed comparisons are Catholic schools. The CECV has 75 primary and combined schools with ICSEA values between 1100 and 1170 (over 15% of its schools). Among these schools:

- The average percentage of students with Chinese language background is 2%
- 65 schools (or 87%) have fewer than 5% of students who speak a Chinese language at home and 72 schools (or 97%) have fewer than 10% of these students
- The highest percentage of students who speak a Chinese language at home in any school is just 15%
- In the majority of schools, there are actually more enrolments of disadvantaged-LBOTE students than students who speak a Chinese language at home.<sup>26</sup>

Nationally, there are almost 250 Catholic primary and combined schools that have ICSEA values between 1100 and 1170. This represents 15% of all Catholic schools. In the ACT, 50% of Catholic primary schools have ICSEA values between 1100 and 1170.

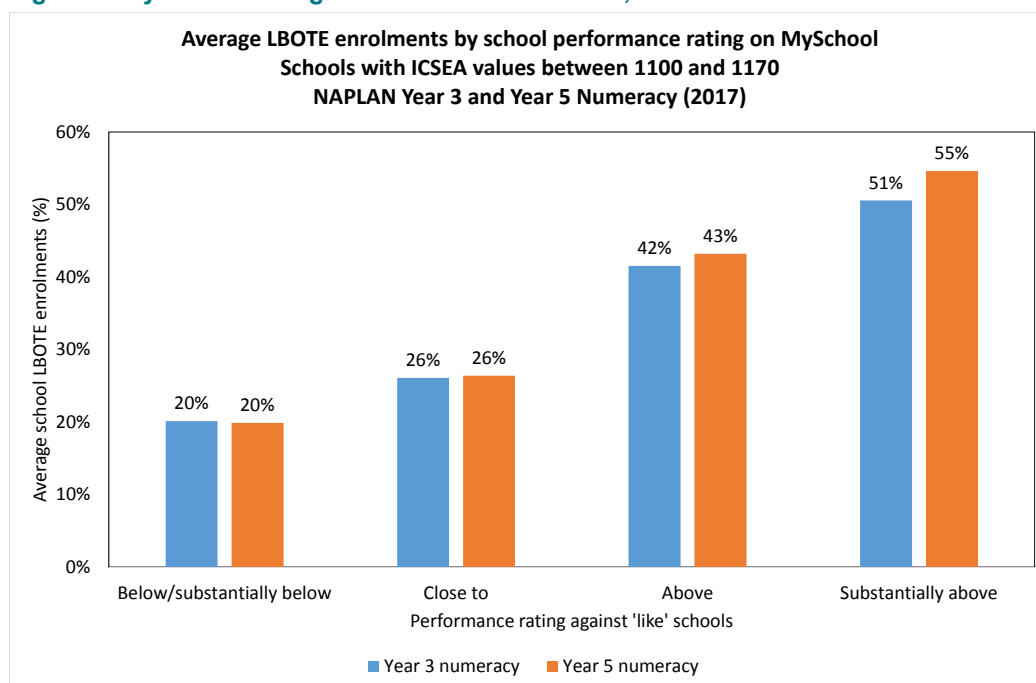
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<sup>26</sup> As shown in section 2, on average, students with Southern European language background (Italian, Spanish, Greek, etc.) score 9-15 points lower in NAPLAN Numeracy than non-LBOTE students. The average percentage of these students in Catholic primary schools with ICSEA values between 1100 and 1170 is 10% (compared to 2% for students with Chinese language background).

This leads to direct comparisons of school NAPLAN data on *My School* that are systematically skewed. Schools with high enrolments of advantaged-LBOTE students (mostly government schools) are directly compared against schools with few of these enrolments (mostly Catholic schools). These comparisons are inappropriate and lead to inaccurate and unfair ratings of school performance in NAPLAN, especially in Numeracy.

Figure 1 further illustrates the concern. It shows the average LBOTE enrolments in schools with ICSEA values between 1100 and 1170, by the rating of school mean NAPLAN scores in Year 3 and Year 5 Numeracy against 'like' schools. There are over 950 primary and combined schools (in all school sectors) with ICSEA values between 1100 and 1170. Schools that are rated 'above' and 'substantially above' have much higher enrolments of LBOTE students than other schools. Many of the schools rated 'above' or 'substantially above' are estimated to have high enrolments of students with Chinese cultural/language background.

**Figure 1: My School ratings and LBOTE enrolments, 2017**



Source: ACARA My School website

### Case study: St Bede's Catholic primary schools, Balwyn North

One example where *My School* presents an inaccurate and unfair rating is for St Bede's School, a Catholic primary school in Balwyn North. St Bede's has an ICSEA value of 1146. In 2017, 10 per cent of its students who sat NAPLAN were LBOTE students, and 5 per cent had a Chinese cultural/language background.

In 2017 NAPLAN tests, St Bede's is rated by *My School* to be 'close to' like schools in Year 3 Numeracy, and 'below' like schools in Year 5 Numeracy. The schools that are judged to be 'like' St Bede's, because of their ICSEA values, are listed in Appendix C.

The schools deemed to be 'like' St Bede's have markedly different LBOTE enrolments. These range from 94% (Carlingford West Public School) to 4% (The Geelong College).

While there is variation in the ratings assigned to different schools, the overall pattern in this group of schools is clear: school ratings partly reflect their LBOTE enrolments (Table 9). On average, schools rated 'above' in Year 3 or Year 5 Numeracy have average LBOTE enrolments of 42-46%. Schools rated 'substantially above' in Year 3 or Year 5 Numeracy have average LBOTE enrolments of 73-92%.

**Table 9: Average LBOTE students (%), St Bede's and 'like' schools, by My School ratings in NAPLAN Numeracy**

Rating on My School	Year 3 Numeracy	Year 5 Numeracy
'Below' / 'substantially below'	22	20
'Close to'	26	29
'Above'	42	46
'Substantially Above'	73	92

Source: ACARA My School website

The only two schools that receive a rating of 'substantially above' in Year 5 Numeracy (Carlingford West Public School and Beverley Hills Primary School) are both estimated to have high enrolments of students with Chinese language background<sup>27</sup>. Benchmarking the NAPLAN scores of St Bede's against these schools is misleading and unfair. The students at these schools are not 'like' or 'statistically similar' to the students at St Bede's. They contain many students with Chinese cultural/language background that achieve higher NAPLAN scores in any school context.

<sup>27</sup> See Appendix B.

## 4. Next steps

Recent research claims *My School* is a common reference for parents, especially in assessing how their child's school is performing in NAPLAN.<sup>28</sup> Yet the preceding sections demonstrate that ICSEA values have major shortcomings, which can make comparisons of school NAPLAN scores on *My School* misleading and unfair. These comparisons must change. Suggestions are provided below.

### **Comparisons of school mean NAPLAN scores**

ACARA claims that 'ICSEA lets us compare schools fairly' because 'schools with students who have similar levels of educational advantage will have similar ICSEA values'.<sup>29</sup> However, the evidence compiled in this report proves this claim is wrong.

If ICSEA scores continue to be used on *My School* to compare school mean NAPLAN scores, then they must take into account student cultural/language background. Student cultural/language background needs to be factored into ICSEA values. This may require additional data on this to be collected from schools and system authorities.<sup>30</sup>

If there is little appetite for this step then ICSEA values and 'like school' comparisons of school mean NAPLAN scores should be discarded. It would be better to present less information, than to present information that is demonstrably misleading and unfair.

### **Comparisons of student gain**

Comparisons of student gain in schools, against students with similar starting scores, are also distorted by student cultural/language background. However, the effect size of student cultural/language background on student gain (after adjusting for starting score) is usually much smaller than its effect on student mean NAPLAN scores.

A sensible way forward would be for *My School* to place much greater emphasis on student gain data than school mean NAPLAN scores and school ICSEA values – especially if ACARA is unable to gather additional information on student language spoken at home.

### **Implications for school funding**

This report suggests that student cultural/language background can be a meaningful indicator of student educational disadvantage, beyond the factors that are currently used to determine loadings in the SRS model. For example, the data shows that students from African cultural/language background experience particularly high levels of educational disadvantage. School funding arrangements could be modified to provide additional funding to these students.

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<sup>28</sup> Colmar Brunton 2018, *ACARA NAPLAN research*, February. See <https://acaraweb.blob.core.windows.net/acaraweb/docs/default-source/assessment-and-reporting-publications/2018-naplan-online-parent-research.pdf?sfvrsn=2>

<sup>29</sup> <https://www.myschool.edu.au/more-information/information-for-principals-and-teachers/icsea-for-principals/>

<sup>30</sup> ACARA should also collect information from schools and system authorities on their enrolments of international students and publish this information on *My School*.

## Appendix A Details on regression analysis

This Appendix provides a series of tables with further information on the regression analysis of student NAPLAN results in Catholic schools in Victoria, that assess the impact of student cultural/language background on student achievement (i.e. their NAPLAN score) and student gain (i.e. the increase in NAPLAN score over time).

Tables A1-A4 provide background and contextual information. Table A1 describes the data used in the analysis, and the data sources. Table A2 provides further information on the method used to identify students experiencing socio-educational disadvantage. Table A3 presents a summary of the dataset for NAPLAN Numeracy. Table A4 presents a summary of the dataset for NAPLAN Reading.

The regression equations shown in Tables A5-A12 have been structured to align with the way school NAPLAN data is compared on *My School*, to assess whether those comparisons are distorted due to LBOTE students.

Tables A5-A8 present estimates from regression analysis of student NAPLAN scores. They are intended to test for effects of student LBOTE status on NAPLAN scores, after taking into account factors used in school ICSEA values. Estimates for Numeracy scores are presented in Table A5 (2017) and A6 (2018). Estimates for Reading scores are presented in Table A7 (2017) and A8 (2018).

Tables A9-A12 present estimates from regression analysis of student gain. They are intended to test for effects of student LBOTE status on student gain, after taking into account factors used in school ICSEA values (Tables A9 and A10) and starting score (Tables A11 and A12).

In the regression equations, the effects of student LBOTE status on NAPLAN data are tested in two ways. First, all LBOTE students are grouped together (Equation 1). Second, the particular language spoken at home by students is identified (Equation 2).

**Table A1: Description of key datasets used in the regression analysis**

Variable	Description	Data source
NAPLAN score	Scaled score for each student in 2017 and 2018 NAPLAN tests in Reading and Numeracy	Victorian Curriculum and Assessment Authority
Starting score	NAPLAN scaled score for each student in their previous NAPLAN test in the same domain	
Student gain	Increase in NAPLAN score for each student from their previous NAPLAN test in the same domain	
Disadvantaged background	A dichotomous variable that identifies whether a student has a disadvantaged family background, based on the education and occupation characteristics of parents. This has been constructed by the Victorian Government for use in school policy analysis and funding in Victoria. It is similar to the student Socio-Educational Advantage variable used in ICSEA scores.	Data on parental education and occupation is collected from students upon enrolment.
School disadvantage	A school-level measure of its proportion of students with disadvantaged family background (as defined above). This is similar to the school-level measure of Socio-Educational Advantage used by ACARA in ICSEA scores.	The dichotomous student variable is calculated by the Victorian Government from this data.
ARIA score	The school Accessibility/Remoteness Index of Australia (ARIA) value. This is also used in ICSEA scores.	Australian Government
ATSI	Identifies whether a student is an Aboriginal and Torres Strait Islander student. This is also used in ICSEA scores.	Data on student ATSI and language spoken at home is collected by Catholic schools upon enrolment.  Languages spoken at home have been aggregated into the 2-digit and 1-digit classifications used by the Australian Bureau of Statistics (Standard Classification of Languages, 2016).  2-digit categories are used for English, Chinese languages and Mon-Khmer languages. All other languages are placed into 1-digit categories.
LBOTE	Identifies whether a student speaks a language other than English in their home.	
African	Identifies whether a student speaks an African language at home (e.g. Tigrinya, Shona).	
Chinese	Identifies whether a student speaks a Chinese language at home (e.g. Cantonese, Mandarin).	
Eastern Asian (excl Chinese)	Identifies whether a student speaks an Eastern Asian language at home (except Chinese) (e.g. Korean, Japanese)	
Eastern European	Identifies whether a student speaks an Eastern European language at home (e.g. Macedonian, Croatian)	
Mon-Khmer	Identifies whether a student speaks a Mon-Khmer language at home (e.g. Vietnamese)	
Northern European	Identifies whether a student speaks a Northern European language at home (except English) (e.g. Finnish).	
Other	Identifies whether a student speaks a language other than English in their home that is not captured by the other categories (e.g. Australian Indigenous language, Polynesian language).	
Southeast Asian (excl Mon-Khmer)	Identifies whether a student speaks a Southeast Asian language at home (excluding Mon-Khmer) (e.g. Indonesian, Tagalog)	
Southern Asian	Identifies whether a student speaks a Southern Asian language at home (e.g. Hindi, Marathi).	
Southern European	Identifies whether a student speaks a Southern European language at home (e.g. Italian, Spanish, Greek).	
Southwest & Central Asian	Identifies whether a student speaks a Southwest and Central Asian language at home (e.g. Arabic)	

**Table A2: Victorian Government approach to identifying disadvantaged students**

		Parental occupation category					
		Senior management in large business organisation, government administration and defence, and qualified professionals	Other business managers, arts/media/sports persons and associate professionals	Tradesmen/women, skilled office, sales and service staff	Machine operators, hospitality staff, assistants, labourers and related workers	Unemployed & pensioners (for 12 months or longer)	Not stated/unknown
Parental education category	Not stated/unknown	Not disadvantaged	Not disadvantaged	Not disadvantaged	Not disadvantaged	Not disadvantaged	Not disadvantaged
	Year 9 or below	Not disadvantaged	Not disadvantaged	<b>Disadvantaged</b>	<b>Disadvantaged</b>	<b>Disadvantaged</b>	Not disadvantaged
	Year 10 or equivalent	Not disadvantaged	Not disadvantaged	<b>Disadvantaged</b>	<b>Disadvantaged</b>	<b>Disadvantaged</b>	Not disadvantaged
	Year 11 or equivalent	Not disadvantaged	Not disadvantaged	<b>Disadvantaged</b>	<b>Disadvantaged</b>	<b>Disadvantaged</b>	Not disadvantaged
	Year 12 or equivalent	Not disadvantaged	Not disadvantaged	Not disadvantaged	<b>Disadvantaged</b>	<b>Disadvantaged</b>	Not disadvantaged
	Certificate I to IV	Not disadvantaged	Not disadvantaged	Not disadvantaged	<b>Disadvantaged</b>	<b>Disadvantaged</b>	Not disadvantaged
	Advanced Diploma/Diploma	Not disadvantaged	Not disadvantaged	Not disadvantaged	Not disadvantaged	Not disadvantaged	Not disadvantaged
	Bachelor degree or above	Not disadvantaged	Not disadvantaged	Not disadvantaged	Not disadvantaged	Not disadvantaged	Not disadvantaged

Source: Victorian Department of Education and Training (<https://www.education.vic.gov.au/school/teachers/management/finance/Pages/srpref011.aspx>)



**Table A3: Key characteristics of students in the dataset – NAPLAN Numeracy tests**

	Year 3 Numeracy		Year 5 Numeracy		Year 7 Numeracy		Year 9 Numeracy	
	2017	2018	2017	2018	2017	2018	2017	2018
Total students	15,238	15,133	15,262	15,629	16,059	16,521	15,424	15,474
Disadvantaged background	1,733	1,658	1,908	1,957	1,423	1,399	1,523	1,478
ATSI students	147	123	96	111	126	114	125	101
LBOTE students	4,307	4,361	4,253	4,469	3,954	4,058	3,793	3,865
<b>LBOTE composition</b>								
African	323	350	284	293	259	279	227	228
Chinese	237	276	234	264	209	195	198	184
Eastern Asian (excl Chinese)	48	50	36	31	45	33	44	32
Eastern European	303	285	283	320	249	251	277	280
Mon-Khmer	620	540	645	704	508	499	537	577
Northern European	84	63	75	79	87	64	61	70
Other	76	92	78	89	71	91	55	66
Southeast Asian (excl Mon-Khmer)	415	496	408	422	393	386	364	377
Southern Asian	676	743	558	622	579	653	390	428
Southern European	1,027	915	1,096	1,068	1,158	1,179	1,276	1,211
Southwest & Central Asian	498	551	556	577	396	428	364	412

Source: Catholic Education Commission of Victoria

**Table A4: Key characteristics of students in the dataset – NAPLAN Reading tests**

	Year 3 Numeracy		Year 5 Numeracy		Year 7 Numeracy		Year 9 Numeracy	
	2017	2018	2017	2018	2017	2018	2017	2018
Total students	15,238	15,175	15,338	15,669	16,136	16,593	15,506	15,556
Disadvantaged background	1,727	1,662	1,925	1,949	1,447	1,405	1,550	1,500
ATSI	148	128	96	111	131	119	123	106
LBOTE	4,322	4,371	4,267	4,468	3,971	4,075	3,810	3,891
<b>LBOTE composition</b>								
African	324	352	287	291	263	280	232	229
Chinese	236	274	233	265	210	197	196	185
Eastern Asian (excl Chinese)	48	48	36	31	45	33	44	32
Eastern European	306	282	285	323	251	255	279	281
Mon-Khmer	621	538	643	700	506	497	541	580
Northern European	84	63	76	79	87	65	59	68
Other	79	92	81	85	73	91	58	66
Southeast Asian (excl Mon-Khmer)	415	495	408	423	392	387	367	375
Southern Asian	678	747	559	622	577	652	390	437
Southern European	1,027	928	1,101	1,067	1,166	1,186	1,280	1,223
Southwest & Central Asian	504	552	558	582	401	432	364	415

Source: Catholic Education Commission of Victoria

**Table A5: Regression analysis of student NAPLAN scores in Catholic schools in Victoria, 2017, Numeracy**

	Year 3 Numeracy		Year 5 Numeracy		Year 7 Numeracy		Year 9 Numeracy	
	Equation 1	Equation 2	Equation 1	Equation 2	Equation 1	Equation 2	Equation 1	Equation 2
Constant	421.25***	421.18***	500.45***	500.39***	558.01***	558.32***	594.25***	594.46***
Disadvantaged background	-28.07***	-23.61***	-21.12***	-19.60***	-21.67***	-21.17***	-15.55***	-17.71***
School disadvantage	-73.68***	-78.41***	-60.87***	-65.65***	-87.42***	-81.33***	-83.39***	-86.31***
School ARIA score	-3.15***	-3.35***	-2.53***	-2.51***	-2.31***	-2.18***	-5.10***	-4.80***
ATSI	-33.47***	-32.54***	-30.70***	-29.82***	-30.47***	-29.95***	-24.93***	-23.50***
LBOTE	4.52***		9.38***		11.43***		6.69***	
African		-33.58***		-32.33***		-33.76***		-31.35***
Chinese		48.62***		53.47***		61.03***		42.56***
Eastern Asian (excl Chinese)		28.47***		57.92***		37.38***		54.82***
Eastern European		-2.15		-4.93		-4.81		-2.87
Mon-Khmer		31.22***		47.98***		43.76***		43.63***
Northern European		11.44		11.37*		6.06		1.48
Other		-54.60***		-31.90***		-34.61***		-26.81***
Southeast Asian (excl Mon-Khmer)		9.20***		10.49***		14.70***		9.01***
Southern Asian		17.47***		27.52***		35.09***		26.00***
Southern European		-12.84***		-6.90***		-11.21***		-14.28***
Southwest & Central Asian		-11.83***		-13.23***		-17.44***		-4.85
Observations	15,206	15,206	15,245	15,245	15,206	15,206	14,631	14,631
R squared	0.05	0.08	0.04	0.09	0.04	0.08	0.04	0.09
Adjusted R squared	0.05	0.08	0.04	0.09	0.04	0.08	0.04	0.09

\*Significant at the 90% level ( $p < 0.1$ ), \*\*Significant at the 95% level ( $p < 0.05$ ), \*\*\*Significant at the 99% level ( $p < 0.01$ )

Source: Catholic Education Commission of Victoria

**Table A6: Regression analysis of student NAPLAN scores in Catholic schools in Victoria, 2018, Numeracy**

	Year 3 Numeracy		Year 5 Numeracy		Year 7 Numeracy		Year 9 Numeracy	
	Equation 1	Equation 2	Equation 1	Equation 2	Equation 1	Equation 2	Equation 1	Equation 2
Constant	415.72***	415.58***	501.93***	501.56***	554.56***	554.57***	598.97***	599.36***
Disadvantaged background	-31.26***	-28.55***	-25.54***	-22.92***	-20.57***	-21.15***	-19.60***	-21.05***
School disadvantage	-79.20***	-80.35***	-71.28***	-74.46***	-100.14***	-95.57***	-101.72***	-101.90***
School ARIA score	1.04	0.88	-3.39***	-3.20***	-2.89***	-2.62***	-3.65***	-3.48***
ATSI	-30.29***	-28.76***	-22.55***	-21.48***	-34.96***	-33.69***	-11.22*	-10.26*
LBOTE	3.36***		10.41***		7.84***		5.70***	
African		-32.34***		-29.41***		-37.38***		-32.59***
Chinese		42.65***		61.34***		64.60***		49.50***
Eastern Asian (excl Chinese)		31.08***		60.44***		41.03***		36.45***
Eastern European		-4.04		-2.77		-1.94		-0.45
Mon-Khmer		33.11***		43.99***		55.13***		42.68***
Northern European		8.42		15.26**		7.57		17.46**
Other		-20.88***		-28.79***		-39.79***		-31.81***
Southeast Asian (excl Mon-Khmer)		12.85***		13.36***		8.16**		10.75***
Southern Asian		13.08***		26.61***		24.83***		16.83***
Southern European		-12.51***		-5.90***		-13.01***		-16.56***
Southwest & Central Asian		-16.48***		-14.01***		-15.95***		-13.77***
Observations	15,122	15,122	15,624	15,624	15,641	15,641	14,691	14,691
R squared	0.06	0.09	0.06	0.11	0.04	0.09	0.04	0.08
Adjusted R squared	0.06	0.09	0.06	0.11	0.04	0.09	0.04	0.08

\*Significant at the 90% level ( $p < 0.1$ ), \*\*Significant at the 95% level ( $p < 0.05$ ), \*\*\*Significant at the 99% level ( $p < 0.99$ )

Source: Catholic Education Commission of Victoria

**Table A7: Regression analysis of student NAPLAN scores in Catholic schools in Victoria, 2017, Reading**

	Year 3 Reading		Year 5 Reading		Year 7 Reading		Year 9 Reading	
	Equation 1	Equation 2	Equation 1	Equation 2	Equation 1	Equation 2	Equation 1	Equation 2
Constant	450.87***	450.99***	520.15***	520.15***	557.31***	557.79***	591.16***	591.54***
Disadvantaged background	-31.24***	-27.13***	-25.67***	-22.85***	-21.51***	-18.95***	-17.75***	-17.96***
School disadvantage	-80.31***	-79.86***	-61.57***	-61.74***	-84.82***	-73.45***	-68.80***	-66.72***
School ARIA score	-4.99***	-5.36***	-4.85***	-5.06***	-3.99***	-4.33***	-7.34***	-7.43***
ATSI	-41.48***	-41.58***	-27.57***	-27.83***	-26.09***	-26.49***	-23.25***	-23.13***
LBOTE	-0.56		-2.16		-2.66*		-5.77***	
African		-25.93***		-42.66***		-37.15***		-29.67***
Chinese		28.01***		30.17***		22.80***		9.60**
Eastern Asian (excl Chinese)		4.04		25.47**		6.52		22.85**
Eastern European		-0.84		-10.94**		-4.11		-8.62**
Mon-Khmer		15.37***		23.28***		8.34***		13.28***
Northern European		-1.74		6.13		13.61**		6.49
Other		-47.02***		-32.50***		-41.83***		-25.80***
Southeast Asian (excl Mon-Khmer)		8.99**		6.11*		11.61***		2.96
Southern Asian		9.52***		15.56***		16.34***		6.03*
Southern European		-11.36***		-12.90***		-11.95***		-13.84***
Southwest & Central Asian		-23.98***		-28.21***		-30.38***		-22.12***
Observations	15,208	15,208	15,321	15,321	15,279	15,279	14,712	14,712
R squared	0.05	0.06	0.04	0.07	0.04	0.06	0.04	0.05
Adjusted R squared	0.05	0.06	0.04	0.07	0.04	0.06	0.04	0.05

\*Significant at the 90% level ( $p < 0.1$ ), \*\*Significant at the 95% level ( $p < 0.05$ ), \*\*\*Significant at the 99% level ( $p < 0.01$ )

Source: Catholic Education Commission of Victoria

**Table A8: Regression analysis of student NAPLAN scores in Catholic schools in Victoria, 2018, Reading**

	Year 3 Numeracy		Year 5 Numeracy		Year 7 Numeracy		Year 9 Numeracy	
	Equation 1	Equation 2	Equation 1	Equation 2	Equation 1	Equation 2	Equation 1	Equation 2
Constant	448.75***	448.62***	523.27***	523.03***	553.86***	553.75***	594.32***	594.48***
Disadvantaged background	-31.84***	-28.78***	-30.78***	-27.35***	-22.31***	-21.50***	-20.41***	-19.98***
School disadvantage	-88.52***	-87.18***	-76.13***	-75.86***	-87.73***	-80.43***	-77.79***	-74.41***
School ARIA score	-1.91*	-2.19**	-2.65***	-2.77***	-6.70***	-6.53***	-6.49***	-6.51***
ATSI	-27.86***	-27.15***	-23.86***	-23.32***	-23.20***	-22.64***	-10.63*	-10.23*
LBOTE	-0.94		0.48		-1.39		-1.08	
African		-26.80***		-37.65***		-38.21***		-29.40***
Chinese		29.42***		31.14***		30.88***		15.61***
Eastern Asian (excl Chinese)		1.64		34.34***		13.22		19.62*
Eastern European		-4.49		-8.81**		-4.44		-4.31
Mon-Khmer		18.15***		27.42***		31.14***		18.59***
Northern European		0.72		16.09*		0.4		15.42**
Other		-13.99		-29.01***		-35.38***		-16.78**
Southeast Asian (excl Mon-Khmer)		16.71***		12.82***		13.55***		17.08***
Southern Asian		11.59***		13.35***		11.31***		6.70**
Southern European		-15.48***		-10.43***		-8.96***		-10.22***
Southwest & Central Asian		-26.61***		-28.20***		-27.74***		-21.79***
Observations	15,165	15,165	15,671	15,671	15,709	15,709	14,774	14,774
R squared	0.05	0.07	0.05	0.08	0.04	0.07	0.04	0.06
Adjusted R squared	0.05	0.07	0.05	0.08	0.04	0.06	0.04	0.05

\*Significant at the 90% level ( $p < 0.1$ ), \*\*Significant at the 95% level ( $p < 0.05$ ), \*\*\*Significant at the 99% level ( $p < 0.01$ )

Source: Catholic Education Commission of Victoria

**Table A9: Regression analysis of student NAPLAN gain in Catholic schools in Victoria, 2015 to 2017 (Numeracy and Reading)**

	Year 3-5 Numeracy		Year 7-9 Numeracy		Year 3-5 Reading		Year 7-9 Reading	
	Equation 1	Equation 2	Equation 1	Equation 2	Equation 1	Equation 2	Equation 1	Equation 2
Constant	91.02***	90.89***	45.12***	44.96***	73.47***	73.39***	32.58***	32.38***
Disadvantaged background	2.07	1.93	2.88***	3.42***	2.03	2.02	3.52**	3.76***
School disadvantage	19.30***	15.04***	7.35**	7.45**	17.98***	15.92***	21.59***	20.34***
School ARIA score	0.55	0.71	-2.71***	-2.67***	1.44*	1.53*	-2.72***	-2.63***
ATSI	-3.09	-2.71	1.9	2.04	-0.26	0.05	0.45	0.66
LBOTE	9.15***		1.93**		3.17**		1.19	
African		9.16***		1.45		-1.24		-3.13
Chinese		2.56		-0.42		7.69*		-1.11
Eastern Asian (excl Chinese)		-10.4		-20.28***		-14.86		-15.27*
Eastern European		1.75		3.38		6.54*		3.65
Mon-Khmer		16.12***		-0.48		9.25***		1.97
Northern European		-6.09		0.22		-3.01		16.61***
Other		15.61**		8.30*		-1.88		3.88
Southeast Asian (excl Mon-Khmer)		9.53***		2.6		2.34		-0.07
Southern Asian		19.40***		9.18***		7.04***		8.60***
Southern European		5.76***		1.6		-0.16		-0.37
Southwest & Central Asian		8.83***		0.36		1.63		2.22
Observations	14,318	14,318	13,981	13,981	14,416	14,416	14,111	14,111
R squared	0.01	0.02	0.005	0.01	0.004	0.01	0.004	0.01
Adjusted R squared	0.01	0.02	0.005	0.01	0.003	0.004	0.004	0.01

\*Significant at the 90% level ( $p < 0.1$ ), \*\*Significant at the 95% level ( $p < 0.05$ ), \*\*\*Significant at the 99% level ( $p < 0.99$ )

Source: Catholic Education Commission of Victoria

**Table A10: Regression analysis of student NAPLAN gain in Catholic schools in Victoria, 2016 to 2018 (Numeracy and Reading)**

	Year 3-5 Numeracy		Year 7-9 Numeracy		Year 3-5 Reading		Year 7-9 Reading	
	Equation 1	Equation 2	Equation 1	Equation 2	Equation 1	Equation 2	Equation 1	Equation 2
Constant	90.12***	90.06***	42.07***	42.05***	80.13***	80.11***	42.18***	41.53***
Disadvantaged background	4.19***	4.39***	-0.05	-0.13	-0.71	-1.24	2.18*	1.63
School disadvantage	6.64*	5.53	14.82***	13.83***	8.63**	7.08	26.78***	23.51***
School ARIA score	-2.04***	-1.98***	-0.37	-0.35	1.57**	1.67**	-1.50**	-1.07*
ATSI	-4.06	-3.95	4.39	4.46	2.52	2.94	1.77	2.09
LBOTE	9.00***		2.12***		3.11**		7.13***	
African		8.30***		5.70**		11.56***		3.1
Chinese		16.22***		3.03		9.54**		15.15***
Eastern Asian (excl Chinese)		3.83		-4.79		-15.06		-8.79
Eastern European		7.38***		1.34		-2.58		5.37**
Mon-Khmer		13.13***		3.51**		9.54***		13.57***
Northern European		-7.00		3.05		6.53		-0.41
Other		10.64*		-5.2		-5.92		20.31***
Southeast Asian (excl Mon-Khmer)		6.53***		5.40***		-3.42		11.96***
Southern Asian		14.58***		1.53		6.79**		9.08***
Southern European		5.93***		-0.15		1.01		4.66***
Southwest & Central Asian		5.11**		0.48		-0.72		4.83**
Observations	14,624	14,624	14,109	14,109	14,726	14,726	14,196	14,196
R squared	0.01	0.01	0.003	0.003	0.001	0.003	0.01	0.01
Adjusted R squared	0.01	0.01	0.002	0.002	0.001	0.002	0.01	0.01

\*Significant at the 90% level ( $p < 0.1$ ), \*\*Significant at the 95% level ( $p < 0.05$ ), \*\*\*Significant at the 99% level ( $p < 0.99$ )

Source: Catholic Education Commission of Victoria



**Table A11: Regression analysis of student NAPLAN gain in Catholic schools in Victoria, 2015 to 2017 (Numeracy and Reading)**

	Year 3-5 Numeracy		Year 7-9 Numeracy		Year 3-5 Reading		Year 7-9 Reading	
	Equation 1	Equation 2	Equation 1	Equation 2	Equation 1	Equation 2	Equation 1	Equation 2
Constant	247.55***	252.51***	177.08***	181.81***	238.04***	241.67***	193.67***	195.69***
Starting score	-0.38***	-0.39***	-0.24***	-0.25***	-0.37***	-0.38***	-0.29***	-0.30***
LBOTE	7.85***		3.19***		-0.3		0.37	
African		-11.04***		-8.08***		-20.35***		-11.84***
Chinese		20.64***		11.95***		15.49***		5.29*
Eastern Asian (excl Chinese)		19.45**		0.25		6.05		-2.29
Eastern European		-1.65		2.52		-0.34		1.46
Mon-Khmer		23.21***		9.54***		9.65***		5.79***
Northern European		0.77		0.1		0.94		12.15**
Other		-7.36		-3.45		-18.13***		-6.33
Southeast Asian (excl Mon-Khmer)		9.73***		4.60***		4.44*		2.15
Southern Asian		22.36***		14.18***		10.09***		9.54***
Southern European		0.95		-1.61*		-4.63***		-2.52**
Southwest & Central Asian		-4.94***		-2.79*		-14.13***		-4.45*
Observations	14,333	14,333	14,743	14,743	14,431	14,431	14,875	14,875
R squared	0.34	0.36	0.19	0.2	0.27	0.28	0.16	0.16
Adjusted R squared	0.34	0.36	0.19	0.2	0.27	0.28	0.16	0.16

\*Significant at the 90% level ( $p < 0.1$ ), \*\*Significant at the 95% level ( $p < 0.05$ ), \*\*\*Significant at the 99% level ( $p < 0.99$ )

Source: Catholic Education Commission of Victoria

**Table A12: Regression analysis of student NAPLAN gain in Catholic schools in Victoria, 2016 to 2018 (Numeracy and Reading)**

	Year 3-5 Numeracy		Year 7-9 Numeracy		Year 3-5 Reading		Year 7-9 Reading	
	Equation 1	Equation 2	Equation 1	Equation 2	Equation 1	Equation 2	Equation 1	Equation 2
Constant	236.51***	242.23***	144.55***	149.31***	233.80***	237.48***	204.08***	206.12***
Starting score	-0.36***	-0.37***	-0.18***	-0.19***	-0.35***	-0.36***	-0.30***	-0.30***
LBOTE	7.84***		2.19***		-0.83		4.87***	
African		-9.14***		-3.05		-10.61***		-7.87***
Chinese		32.29***		11.71***		16.16***		16.51***
Eastern Asian (excl Chinese)		27.29***		2.15		-0.13		2.53
Eastern European		3.42		0.46		-6.13**		3.41
Mon-Khmer		19.06***		9.46***		7.94***		13.64***
Northern European		2.55		5.71		10.90*		4.07
Other		-8.22*		-12.27***		-18.55***		5.79
Southeast Asian (excl Mon-Khmer)		8.17***		6.29***		0.58		13.14***
Southern Asian		18.51***		4.20**		7.93***		8.87***
Southern European		2.12*		-3.18***		-3.18*		1.07
Southwest & Central Asian		-8.07***		-4.45**		-18.75***		-3.36
Observations	14,629	14,629	14,859	14,859	14,731	14,731	14,942	14,942
R squared	0.31	0.33	0.1	0.11	0.21	0.21	0.19	0.19
Adjusted R squared	0.31	0.33	0.1	0.11	0.21	0.21	0.19	0.19

\*Significant at the 90% level ( $p < 0.1$ ), \*\*Significant at the 95% level ( $p < 0.05$ ), \*\*\*Significant at the 99% level ( $p < 0.99$ )

Source: Catholic Education Commission of Victoria

## Appendix B Example primary schools with high enrolments of students with Chinese cultural/language background

This Appendix explains how the government primary schools listed in section 3 were identified. These schools are estimated to have very high enrolments of students with Chinese cultural/language background.

Unfortunately, no data is publicly available on the language spoken at home by students in government schools. Only data on the overall percentage of LBOTE enrolments in each school is available. It is possible, however, to identify government primary schools likely to have a high number of students with Chinese cultural/language background from the Census of Population and Housing.

Census data identifies the suburbs where the most primary students live who speak a Chinese language at home and attend a government school. The suburbs with the highest number of these students are listed in Table B1. All but three of these suburbs are in New South Wales and Victoria.

Given its use of Census data, which is based on the place of residence of students, this approach is most reliable for primary schools (given students in primary schools mostly attend schools close to their homes).

Using *My School*, government primary schools in these suburbs can then be identified. Almost all of the government primary schools in the selected suburbs have a high percentage of LBOTE students. This validates the approach to identifying schools.

In many cases, there is only one government primary school in each of the suburbs shown. This school is collected for inclusion in the case study in section 3.3. However, where there are multiple government primary schools, the one with the highest percentage of LBOTE enrolments is usually selected.

For the suburbs listed, Table B1 also shows the percentage of primary students who speak a Chinese language at home who are enrolled in a Catholic primary school. These percentages are very low. This further indicates that Catholic schools, overall, have very few enrolments of students with Chinese cultural/language background.

**Table B1: Suburbs and government primary schools with many students with Chinese language background, 2017**

Suburb	State	Students with Chinese language background in government primary schools	Catholic sector share of primary students with Chinese language background (%)	Example government primary/combined school in suburb	School ICSEA	School LBOTE (%)
Glen Waverley	VIC	699	5%	Mount View Primary School	1155	84
Carlingford	NSW	671	2%	Carlingford Public School	1122	79
Hurstville	NSW	670	6%	Hurstville Public School	1100	97
Doncaster East	VIC	527	6%	Beverley Hills Primary School	1147	89
Epping (NSW)	NSW	521	2%	Epping Public School	1162	84
Chatswood	NSW	432	8%	Chatswood Public School	1164	85
Baulkham Hills	NSW	406	4%	Crestwood Public School	1122	50
Eastwood (NSW)	NSW	391	2%	Denistone East Public School	1150	77
Campsie	NSW	354	10%	Campsie Public School	1018	97
Castle Hill (NSW)	NSW	351	2%	Castle Hill Public School	1120	63
Mount Waverley	VIC	333	5%	Pinewood Primary School	1144	66
Balwyn North	VIC	320	4%	Balwyn North Primary School	1150	76
Point Cook	VIC	316	7%	Alamanda K-9 College	1098	66
Willetton	WA	281	1%	Willetton Primary School	1125	52
Hornsby	NSW	263	5%	Hornsby North Public School	1150	62
Canning Vale	WA	261	4%	Ranford Primary School	1102	47
Sunnybank Hills	QLD	258	6%	Sunnybank Hills State School	1111	69
Doncaster	VIC	232	9%	Birralee Primary School	1150	47
Cherrybrook	NSW	232	3%	John Purchase Public School	1152	69

Source: Australian Bureau of Statistics, Census of Population and Housing, 2016, Table Builder and ACARA MySchool website

## Appendix C School case study

Table C1 lists schools deemed to be 'like' St Bede's on *My School*. It also shows their LBOTE enrolments and *My School* ratings compared to 'like' schools in Numeracy.

**Table C1: St Bede's School and 'like' schools**

School	LBOTE (%)	Rating versus 'like' schools (Numeracy, 2017)	
		Year 3	Year 5
St Roch's School	29	Above	Close to
Ivanhoe Primary School	35	Above	Close to
Camelot Rise Primary School	51	Above	Above
St George Christian School	34	Above	Above
Our Lady of Dolours Catholic Primary School	70	Above	Close to
Oakhill Drive Public School	55	Above	Close to
Pinewood Public School	66	Above	Above
Mentone Grammar School	17	Above	Close to
Westbourne Grammar School	39	Above	Above
Covenant Christian School	23	Above	Close to
Thornleigh West Public School	24	Above	Close to
Haberfield Public School	59	Above	Close to
Toowong State School	45	Above	Below
Concordia College	8	Below	Below
Our Lady of the Rosary School	5	Below	Below
St Mary's School	22	Below	Close to
Goodwood Primary School	20	Below	Below
Highgate School	19	Below	Close to
Paddington Public School	38	Below	Above
Majura Primary School	26	Below	Below
Santa Sabina College	47	Below	Close to
Burnside Primary School	12	Below	Close to
Mercedes College	10	Below	Below
Vaucluse Public School	30	Below	Below
St Joseph's Catholic Primary School	39	Below	Below
Elthan East Primary School	9	Below	Close to
<b>St Bede's School</b>	<b>10</b>	<b>Close to</b>	<b>Below</b>

School	LBOTE (%)	Rating versus 'like' schools (Numeracy, 2017)	
North Sydney Public School	48	Close to	Above
Ormond Primary School	32	Close to	Close to
Prince Alfred College	18	Close to	Below
North Perth Primary School	18	Close to	Below
Surrey Hills Primary School	22	Close to	Close to
Rossmoyne Primary School	49	Close to	Close to
St Keiran's Catholic Primary School	25	Close to	Below
Windsor State School	15	Close to	Close to
Ascot State School	16	Close to	Close to
All Saints Anglican School	13	Close to	Close to
The Illawarra Grammar School	18	Close to	Close to
Kensington Public School	66	Close to	Above
Sherwood State School	23	Close to	Above
Holland Park State School	20	Close to	Close to
The Geelong College	4	Close to	Below
St Anthony's Catholic Primary School	8	Close to	Close to
William Clarke College	35	Close to	Close to
Manly West Public School	22	Close to	Close to
Brindabella Christian College	25	Close to	Close to
Black Rock Primary School	13	Close to	Close to
Leichhardt Public School	31	Close to	Close to
St Mark's Catholic Primary School	46	Close to	Below
Stella Maris School	6	Close to	Below
St Martha's Catholic Primary School	69	Close to	Close to
Wesley College	21	Close to	Close to
St Agatha's Catholic Primary School	28	Close to	Below
Wales Street Primary School	27	Close to	Close to
Sacred Heart Primary School	38	Close to	Close to
Carlingford West Public School	94	Substantially Above	Substantially Above
Wattle Park Primary School	36	Substantially Above	Close to
Beverley Hills Primary School	89	Substantially Above	Substantially Above
St Peter's Lutheran School	9	Substantially Below	Below
Petrie Terrace State School	16	Substantially Below	Close to