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The NAPLAN performance of the ACT's high socio-economic schools

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TAI

Policy Brief

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List of Abbreviations

Abbreviations:

ABS – Australian Bureau of Statistics

ACARA – Australian Curriculum, Assessment and Reporting Authority

ACER – Australian Council of Educational Research

ACT – Australian Capital Territory

APPA – Australian Primary Principals Association

DSA – Dyslexia SPELD ACT

ELA – Essential Learning Areas

ICSEA – Index of Community Socio-Education Advantage

K – 6 – Kindergarten – year 6

KLA – Key Learning Areas

LBOTE – Language Background Other Than English

MultiLit – Making Up for Lost Time in Literacy

NAPLAN – National Assessment Program – Literacy and Numeracy

NSW – New South Wales

SES – Socio-economic status

SPELD – Specific Learning Difficulties

SSSG – Statistically Similar Schools Group

Executive summary

Context

The *National Assessment Program – Literacy and Numeracy* (NAPLAN) is a national standardised literacy and numeracy test conducted four times over a student's schooling life (Years 3, 5, 7 and 9). The program began in 2008 and is administered by the Australian Curriculum, Assessment and Reporting Authority (ACARA). Since 2010, NAPLAN results for each school have been published on the *My School* website.

Almost every year, politicians and others hail the achievements of the Australian Capital Territory's (ACT) schools in NAPLAN tests because the average results from across the Territory tend to be above those from other Australian jurisdictions. While there are many aspects of the ACT education system that deserve praise, the practice of judging the performance of ACT schools on the basis of jurisdictional averages, without accounting for the socio-economic profile of the relevant student populations, is misleading. International and domestic research has consistently demonstrated that the academic performance of students is influenced by their socio-economic background (i.e. the occupation and education level of their parents or carers). Research has also shown that student performance is affected by school-level factors, including their remoteness and the composition of the student body. Owing to the influence of these factors, the NAPLAN performance of schools should only be compared with other schools that share similar profiles.

To promote a more informed debate about school performance in the ACT, this report compares the NAPLAN performance of 24 high socio-economic status (SES) ACT primary schools over the period 2008 to 2016 to school groups with similar student- and school-level profiles (known as Statistically Similar Schools Groups (SSSGs)).[1] The NAPLAN performance of these schools was evaluated on the basis of the results in Years 3 and 5. Performance was assessed using two measures: the mean result for each of the five subjects (reading, writing, spelling, grammar and punctuation, and numeracy); and the proportion of students performing below the national minimum standard in each of the subjects.

In reporting the results, the terms 'significantly' and 'substantially' (above/below the corresponding SSSG mean) are used. Consistent with the approach taken on the *My School* website, *significantly* above/below means the selected school's mean result was above/below the corresponding SSSG mean by between 0.2 and 0.5 of one standard deviation. *Substantially* above/below means the selected school's mean result was above/below the corresponding SSSG mean by more than 0.5 of one standard deviation.

Results

The findings demonstrate that, as a whole, high SES ACT primary schools have tended to perform below the level of their SSSGs in NAPLAN tests over the period 2008-2016.

Over the study period, there was a total of 2160 mean results from the schools (90 per school). Seventy percent (70%) of the results from the ACT schools were below the corresponding SSSG mean. In 41% of cases, the mean result from the schools was *significantly* or *substantially* below the corresponding SSSG mean (32% were *significantly* below and 8% were *substantially* below). By comparison, only 29% of the mean results from the ACT schools were above the corresponding SSSG mean, with a mere 11% being *significantly* or *substantially* above (10% were *significantly* above and 2% were *substantially* above).

[1] The schools covered in this report are in the top 10% of Australian schools as measured by their socio-economic status.

The apparent underperformance of ACT schools is mostly attributable to government schools. Government schools performed substantially worse than non-government schools when judged on the basis of comparable SSSG outcomes. Forty-six per cent (46%) of the mean results from government schools were *significantly* or *substantially* below the corresponding SSSG mean. In contrast, 26% of the mean results from non-government schools were *significantly* or *substantially* below the corresponding SSSG mean.

Consistent with this, 84% of the mean results that were *significantly* or *substantially* below the corresponding SSSG mean came from government schools, whereas government schools made up only 75% of the sample. Government school results for low performing students were particularly alarming. The average proportion of students from the sample government schools that performed below the national minimum standard was 80% higher than the SSSG average. In addition, in 26% of cases, the proportion from the sample government schools that performed below the national minimum standard was equal to or greater than the national average.

A large proportion of the government results that were significantly above the corresponding SSSG mean came from two schools with gifted streams. Together, these two schools accounted for 33% of the *significantly* and *substantially* above results from government schools. One other government school's relative results stood out: 31% of its average results were *significantly* or *substantially* above the corresponding SSSG mean, the highest proportion of any government school in the sample and second highest in the entire sample. Combined, these three government schools accounted for 53% of the *significantly* and *substantially* above results from government schools, even though they made up only 17% of the government school sample.

When these schools are removed from the government school sample:

- the proportion of mean results from government schools that were *significantly* or *substantially* above the corresponding SSSG mean falls from 8% to 5%; and
- the proportion of mean results from government schools that were *significantly* or *substantially* below the corresponding SSSG mean rises from 46% to 53%.

Consistent with these results, the apparent underperformance amongst government schools was also reasonably concentrated. Seven schools accounted for 56% of the *significantly* or *substantially* below results recorded over the study period amongst government schools, even though these schools made up only 39% of the government school sample. Only 3% of the mean results from these schools were *significantly* or *substantially* above the corresponding SSSG mean.

Judged as group, the NAPLAN performance of the six non-government schools was slightly below average. Forty-four percent (44%) of the mean results from the non-government schools were above the corresponding SSSG mean and 55% were below. Most relevantly, 20% of the non-government school results were *significantly* or *substantially* above the corresponding SSSG mean and 26% were *significantly* or *substantially* below.

The performance of one school materially influenced the results from the non-government school group. Only one of this school's 90 mean results was *significantly* below its SSSG's mean; none were *substantially* below. The school also accounted for 45% of the *significantly* and *substantially* above results from non-government schools. With this school removed from the sample, the proportion of non-government school results that were *significantly* or *substantially* above the corresponding SSSG mean falls from 20% to 13%, and the proportion that were *significantly* or *substantially* below the corresponding SSSG mean rises from 26% to 31%.

Conclusions and recommendations

The results of the analysis suggest there is a systemic problem with the relative performance of high SES government primary schools in the ACT in NAPLAN tests. The reasons for this apparent underperformance are unclear. Arguably, amongst all the possible explanations, two of the more prospective are:

- the Index of Community and Socio-educational Advantage (ICSEA) scores used to derive the SSSGs do not adequately capture the true student- and school-level profiles of the schools; and
- there are deficiencies in teaching practices in the sample schools related to the uptake of direct instruction and other evidence-based teaching methods.

While these appear to be amongst the best explanations, there is currently insufficient information available to reach firm conclusions on the true causes of the apparent underperformance of the sample government schools.

Immediately prior to the release of this report, the ACT Auditor-General released a report on performance information on ACT government schools.[2] The report includes data on the relative NAPLAN performance of all ACT government schools for years 3, 5, 7 and 9 for the years 2015 and 2016. The data presented in the Auditor-General's report are consistent with the results of our analysis, suggesting the apparent underperformance of ACT government schools is system-wide and not confined to high SES schools.

On the basis of the above, we recommend:

- an inquiry be undertaken to determine why ACT government schools appear to be underperforming in NAPLAN tests relative to their SSSGs;
- a voluntary program be established in underperforming schools to trial the use of best practice direct instruction teaching methods; and
- ACARA amend the *My School* website to improve access to data on school and SSSG performance, particularly time-series data.

[2] ACT Auditor-General (2017). *Performance Information in ACT Public Schools*. Government of the Australian Capital Territory, Canberra.

1. Introduction

The *National Assessment Program – Literacy and Numeracy* (NAPLAN) is a national standardised literacy and numeracy test conducted four times over a student's schooling life (Years 3, 5, 7 and 9).[3] The program began in 2008 and is administered by the Australian Curriculum, Assessment and Reporting Authority (ACARA). Since 2010, NAPLAN results for each school have been published on the *My School* website.[4]

NAPLAN is intended to provide a comprehensive picture of the academic performance of Australian students in Years 3, 5, 7 and 9. All Australian students in these years are expected to complete the test. However, exemptions are available for students with a significant or complex disability and for students from a non-English speaking background who have been in Australia less than 12 months.[5] In addition, students may be withdrawn if their parents object to the NAPLAN tests.

NAPLAN and the *My School* website have manifest transparency and accountability functions but their ultimate aim is to improve school performance. These improvements could be achieved via three casual mechanisms. First, the NAPLAN data could help schools make better decisions on teaching methods and resource allocation. Second, the data could help government policy-makers make better decisions on curricula design, school programs and the allocation of resources, which in turn, could flow through to school performance. Third, the NAPLAN data could arm parents, carers and other stakeholders with a means by which to judge school performance and pressure schools and policy-makers to improve outcomes. This pressure could be direct (parents, carers and stakeholders asking school managers, teachers and policy-makers to make changes) or indirect (parents and carers moving their children to schools with better NAPLAN results and the loss of students then prompts change).

Almost every year, politicians, media outlets and other stakeholders hail the achievements of the Australian Capital Territory's (ACT) schools in NAPLAN tests because the average results from across the Territory tend to be above those from other Australian jurisdictions.[6] For example, commenting on the release of the 2015 NAPLAN summary information, then ACT Education Minister Joy Burch said she was 'delighted that the release of the latest NAPLAN 2015 information confirms ACT students continue to be among the highest performing across the country'. She also added that the ACT has 'been the highest performing jurisdiction in Australia every year since 2008'.[7] More recently, the current ACT Education Minister, Yvette Berry, stated 'Canberra school students continue to perform well in national comparisons in NAPLAN, particularly in reading, grammar and punctuation and numeracy'.[8]

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[3] The introduction of the NAPLAN in 2008 replaced a number of existing literacy and numeracy tests conducted at the state level such as the *Achievement Improvement Monitor* in Victoria and the *English Language and Literacy Assessment* and *Secondary Numeracy Assessment Program* in New South Wales (NSW).
[4] See https://www.myschool.edu.au/ (23 May 2017).
[5] Australian Curriculum and Reporting Authority (ACARA) (2013), 'NAPLAN – participation'. Available at: https://www.nap.edu.au/information/faqs/naplan--participation (23 May 2017).
[6] L. Cox (2013), 'Canberra NAPLAN results show ACT best students in Australia', *The Canberra Times*, 13 September; J. Burch (2014), 'ACT remains top of the class in NAPLAN', Media Release, ACT Government, 18 August; E. Macdonald (2015), 'ACT kids improve already top NAPLAN results', *The Canberra Times*, 5 August.
[7] J. Burch (2015), 'ACT Students are high achievers', Media Release, ACT Government, 5 August.
[8] Y. Berry (2017), 'Report confirms government's focus on the future of education', Media Release, ACT Government, 3 February.

While there are many aspects of the ACT education system that are deserving of praise, the practice of judging the performance of ACT schools on the basis of jurisdictional averages, without accounting for the socio-economic profile of the relevant student populations, is misleading.[9] International and domestic research has consistently demonstrated that the academic performance of students is influenced by their socio-economic background (i.e. the occupation and education level of their parents or carers).[10] Research has also shown that student performance is affected by school-level factors, including their remoteness and the composition of the student body.[11] Owing to the influence of these factors, the NAPLAN performance of schools should only be compared with other schools that share similar profiles.

To enable policy-makers and parents to make 'fair and reasonable' comparisons,[12] the *My School* website generates a Statistically Similar Schools Group (SSSG) for each school using the Index of Community and Socio-educational Advantage (ICSEA). The ICSEA of a school is a numerical measure of its level of educational advantage, which accounts for student- and school-level factors that are known to influence academic performance. Broadly, the inputs to the ICSEA calculation consist of: (a) family background information provided to schools by families regarding parent or carer occupation and education (student-level factors); and (b) data concerning the remoteness of the school and the proportion of students identifying as Indigenous (school-level factors).[13] The ICSEA values are calculated on a scale with a median of 1000, a standard variation of 100 and a typical range of between 500 (extreme educational disadvantage) and 1300 (very high educational advantage).[14] For any given school, its SSSG will consist of up to 60 schools from across Australia that have similar ICSEA values (although this number is reduced for those schools with ICSEA scores at either end of the ICSEA spectrum).

The objective of this report is to promote a more informed debate about the quality of education in ACT schools by comparing the NAPLAN performance of high socio-economic status (SES) ACT primary schools (ICSEA scores ≥1130) to their SSSGs over the period 2008 to 2016.[15] The decision to focus on high SES primary schools was based on two main factors. First, the *My School* website has been designed in a way that obstructs access to, and the extraction of, time-series data on the relative

[9] Some stakeholders have raised concerns about this. See Editorial (2017), 'No room for complacency in ACT school performance', The Canberra Times, 6 February; E. McDonald (2015), 'ACT schools falling behind on league tables', *The Canberra Times*, 8 March; J. Waterford (2015), 'Canberra schools settling for second best', *The Canberra Times*, 13 March.

[10] G. Marks, J. Cresswell and J. Ainley (2006), 'Explaining socioeconomic inequalities in student achievement: The role of home and school factors', *Educational Research and Evaluation: An International Journal on Theory and Practice* 12(2), 105-128; G. Considie and G. Zappalà (2002), 'The influence of social and economic disadvantage in the academic performance of school students in Australia', *Journal of Sociology* 38(2), 129-148; C. Carmichael, A. MacDonald and L. Mcfarland-Piazza (2014), 'Predictors of numeracy performance in national testing programs: Insight from the longitudinal study of Australian children', *British Educational Research Journal* 40(4), 637-659.

[11] Considie and Zappalà (2002); Marks *et al*. (2006); Carmichael *et al*. (2014); A. Sutton and I. Soderstrom (1999), 'Predicting Elementary & Secondary School Achievement With School-Related and Demographic Factors', *The Journal of Educational Research* 92(6), 330-338.

[12] ACARA (2016), *What does the ICSEA value mean?*, ACARA, Sydney.

[13] ACARA (2016), *What does the ICSEA value mean?*, ACARA, Sydney.

[14] ACARA (2015), *Guide to understanding ICSEA (Index of Socio-educational Advantage) values: From 2013 onwards*, ACARA, Sydney.

[15] An ICSEA score of ≥1130 means the school is approximately in the top 10% of Australian schools as measured by their socio-economic status.

performance of schools, ensuring any research of this nature requires considerable time and resources. These difficulties, and a limited budget for the project, meant that only a relatively small proportion of ACT's schools could be evaluated. Secondly, the performance of high SES schools is a relatively under-studied and discussed area. The majority of students that perform below or significantly below minimum standards attend low SES schools. This has understandably led to a focus in research and public policy toward low SES schools in an effort to improve outcomes.[16] A downside of this is that student performance in high SES schools has received little attention.

The remainder of this report is set out as follows. Section 2 provides details of the method. Section 3 presents the results. Section 4 discusses the results and provides possible explanations for the identified trends in NAPLAN performance. Section 5 provides recommendations and conclusions.

2. Method

2.1 Data source

All data used in the study concerning ICSEA values and NAPLAN performance were obtained from the *My School* website. The *My School* website is a publicly available resource maintained by ACARA. Data from the website is permitted to be reproduced and distributed for non-commercial and educational purposes, including research. Relevant data were obtained from the website over the periods March-June 2015 (results from the years 2008-2014), May 2016 (results from 2015) and May 2017 (results from 2016).

2.2 Sample

The sample of ACT primary schools was determined using three criteria:

- schools must have offered education covering the first two NAPLAN testing periods (Year 3 and 5) in 2014 (i.e. not those offering K-2 and K-4 education only);
- schools must have had an ICSEA value of ≥1130 in 2014; and
- schools must have had at least 150 enrolled students in 2014.[17]

2014 was used as the basis for school selection as it was the final year available when the data were first collected.

Within the ACT, there are 100 schools offering primary education. The application of the above criteria removed 76 schools, leaving 24 schools forming the main sample, comprised of 18 government schools and six non-government schools (Table 1).

[16] L. B. Perry and A. McConney (2013), 'School socioeconomic status and student outcomes in reading and mathematics: A comparison of Australia and Canada', *Australian Journal of Education* 57(2), 124-140; V. Koutsoeorgopulou (2009), *Enhancing Education Performance in Australia*, Organisation for Economic Cooperation (OECD) Economics Department Working Papers, no. 678, OECD Publishing, Paris.

[17] Schools with fewer than 150 students were excluded because: (a) NAPLAN results are not reported when there are fewer than five students in a year cohort; and (b) small student numbers affect the ability to draw policy-relevant inferences on school performance from NAPLAN data (i.e. there can be a high level of year-to-year volatility due solely to differences in student characteristics).

Table 1. Main sample and school type

Schools identified	100
Schools excluded	76
Schools forming sample	24
Government schools	18
Non-government schools	6
Selective entry school	0
Schools with gifted streams	3

Source: *My School* website; ACT Education and Training Directorate (2017)[18]

A web search and phone calls to individual schools were also made to determine whether any of the schools were academically selective or had gifted streams. The NAPLAN results of academically selective schools and schools with gifted streams are likely to be higher than other schools with similar SES characteristics. This is due to the increased likelihood of having a higher proportion of academically gifted children at the school. No academically selective schools were identified but three schools with gifted streams were (Table 1).

2.3 Analytical Approach

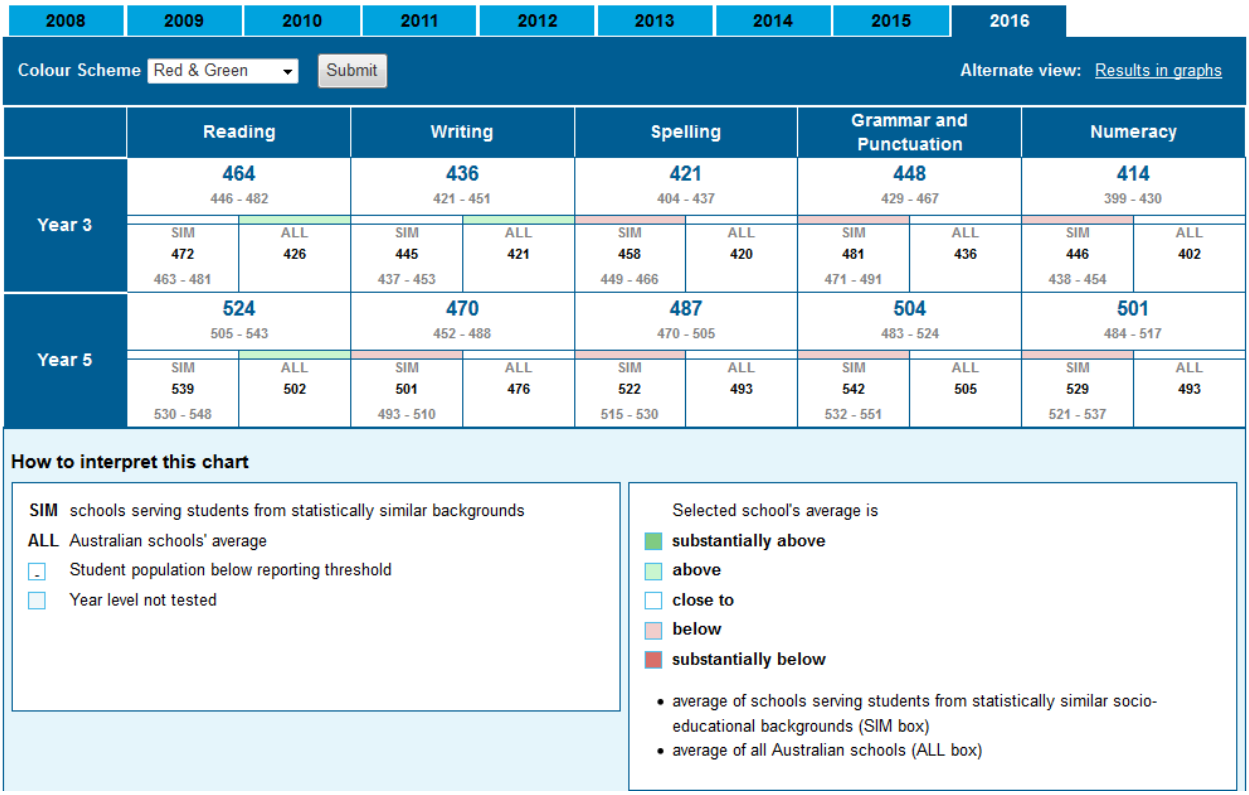
The NAPLAN performance of schools in the sample was evaluated on the basis of the results in Years 3 and 5 over the period 2008-2016. Performance was assessed using two measures: the mean result for each subject; and the proportion of students performing below the national minimum standard.

Mean subject results

The data on mean results were obtained from the 'results in numbers' pages for each school on the *My School* website. Figure 1 provides an example of the data shown on a 'results in numbers' page from the sample. The mean results in each of the five subjects were collected for each school and compared to the mean of the relevant SSSGs in the corresponding subjects. In reporting the results, the terms 'significantly' and 'substantially' (above/below the corresponding SSSG mean) are used. Consistent with the approach taken on the *My School* website, *significantly* above/below means the selected school's mean result was above/below the corresponding SSSG mean by between 0.2 and 0.5 of one standard deviation. *Substantially* above/below means the selected school's mean result was above/below the corresponding SSSG mean by more than 0.5 of one standard deviation.

[18] ACT Education and Training Directorate (2017), 'Education and Training Directorate: Directory of Schools'. Available at: http://www.education.act.gov.au/school_education/directory_of_schools (23 May 2017).

Figure 1. Results in numbers of sample school depicting sample school mean result, sample school margin of error, SSSG mean result, SSSG margin of error and national mean



2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016

Colour Scheme: Red & Green — Submit — Alternate view: Results in graphs

	Reading		Writing		Spelling		Grammar and Punctuation		Numeracy	
Year 3	464 (446 - 482)		436 (421 - 451)		421 (404 - 437)		448 (429 - 467)		414 (399 - 430)	
	SIM 472 (463 - 481)	ALL 426	SIM 445 (437 - 453)	ALL 421	SIM 458 (449 - 466)	ALL 420	SIM 481 (471 - 491)	ALL 436	SIM 446 (438 - 454)	ALL 402
Year 5	524 (505 - 543)		470 (452 - 488)		487 (470 - 505)		504 (483 - 524)		501 (484 - 517)	
	SIM 539 (530 - 548)	ALL 502	SIM 501 (493 - 510)	ALL 476	SIM 522 (515 - 530)	ALL 493	SIM 542 (532 - 551)	ALL 505	SIM 529 (521 - 537)	ALL 493

How to interpret this chart

SIM schools serving students from statistically similar backgrounds
ALL Australian schools' average
Student population below reporting threshold
Year level not tested

Selected school's average is
substantially above
above
close to
below
substantially below

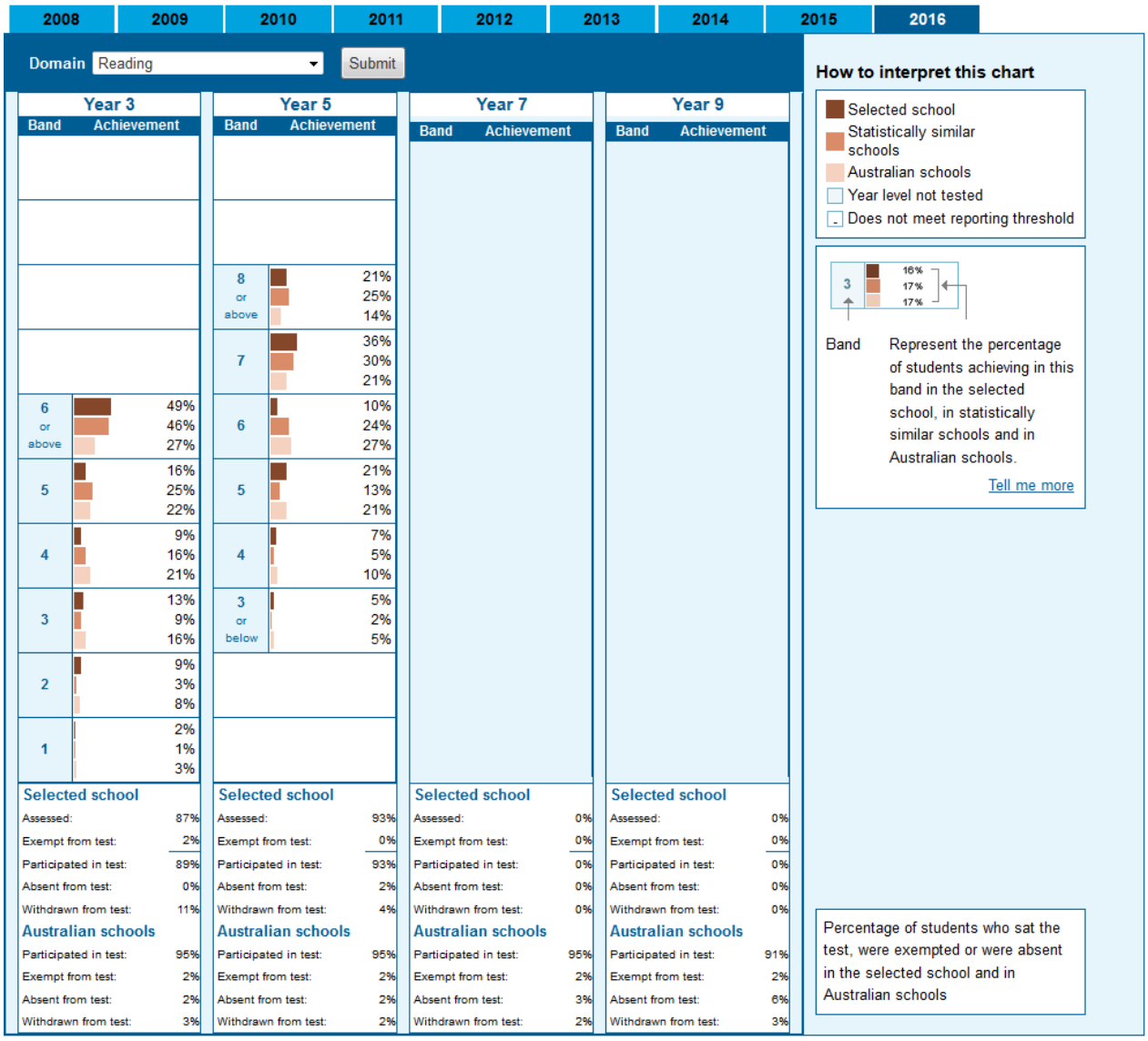
- average of schools serving students from statistically similar socio-educational backgrounds (SIM box)
- average of all Australian schools (ALL box)

Proportion of students performing below the national minimum standard

In addition to the information on mean results, the *My School* website includes data on the proportion of students in each of the NAPLAN achievement bands for each subject in the 'results in bands' pages (Figure 2). All NAPLAN results are reported in bands. For Year 3, the relevant bands are 1, 2, 3, 4, 5 and '6 or above' (1 reflecting low achievement and '6 or above' reflecting very high achievement). For Year 5, the relevant bands are '3 or below', 4, 5, 6, 7 and '8 or above'. The national minimum standard for students is the second lowest band for their year group. Hence, for Year 3 students, the national minimum standard is band 2 and, for Year 5, the minimum standard is band 4.[19] Data on the proportion of students performing below the national minimum standard for each subject was collected from the 'results in bands' pages and compared to the national averages and the equivalent results from the SSSGs.

[19] ACARA (2017), 'How to interpret'. Available at: http://www.nap.edu.au/results-and-reports/how-to-interpret (23 May 2017).

Figure 2. Results in bands of a sample school depicting the proportion of students in each of the NAPLAN bands, the proportion in each band from the SSSG and the proportion in each band from all Australian schools



3. Results

3.1 Sample schools

Over the period 2008 to 2016, each school had a total of 90 mean results from across the five subjects: reading, writing,[20] spelling, grammar and punctuation, and numeracy. With 24 schools in the sample, this provided a total of 2160 mean results. Seventy percent (70%) of the results from the ACT schools were below the corresponding SSSG mean (Table 2). In 41% of cases, the mean result from the schools

[20] The nature of the NAPLAN writing assessment task has changed over time. Between 2008 and 2010, it was a narrative writing task. Between 2011 and 2015, it was a persuasive writing task. In 2016, it was a narrative writing task. Due to the changes in the nature of the task, the writing results are not a consistent time series. Here, we report only the relative performance of the sample schools compared to their SSSGs, meaning the changes in the assessment task and scale are not relevant.

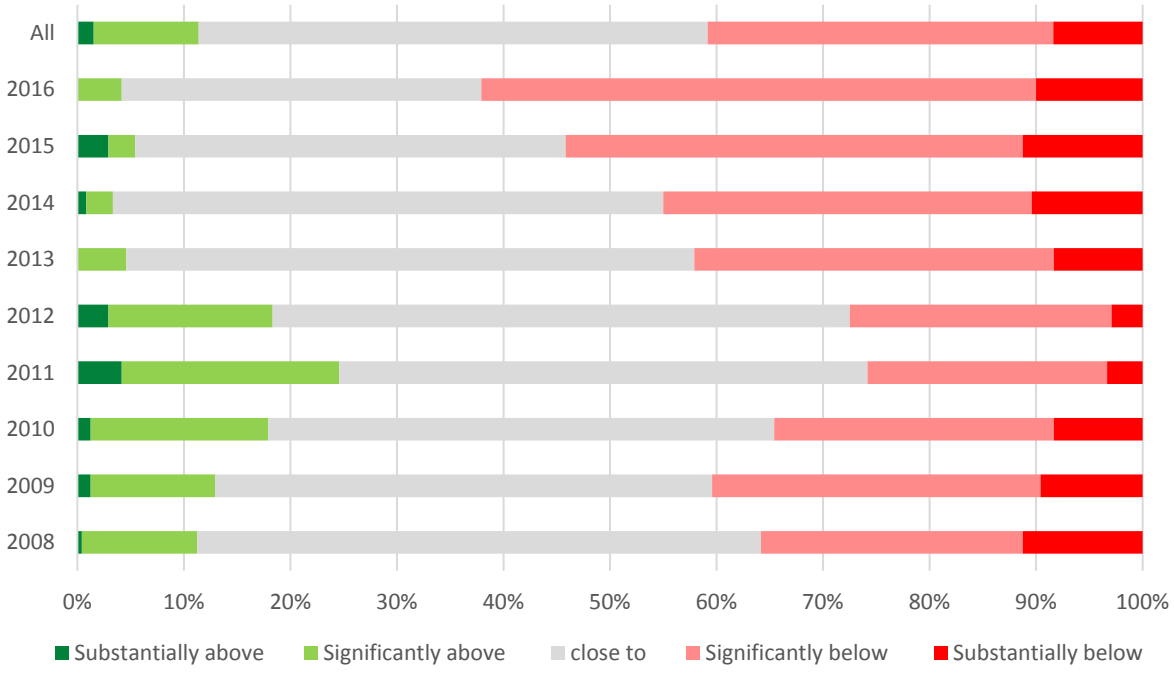
was *significantly* or *substantially* below the corresponding SSSG mean (32% were *significantly* below and 8% were *substantially* below). By comparison, only 29% of the mean results from the ACT schools were above the corresponding SSSG mean, with a mere 11% being *significantly* or *substantially* above (10% were *significantly* above and 2% were *substantially* above).

Table 2. Mean results from sampled ACT schools compared to SSSG means, all subjects, 2008-2016

	No.	%
Results	2160	—
Above SSSG mean	**627**	**29%**
Significantly above	213	10%
Substantially above	33	2%
Significantly or substantially above SSSG mean	**246**	**11%**
Below SSSG mean	**1504**	**70%**
Significantly below	701	32%
Substantially below	181	8%
Significantly or substantially below SSSG mean	**882**	**41%**

The most prominent trend in the time series results was the deterioration in the relative school performance since 2011 (Figure 3). In every year since 2011, the proportion of results that were *significantly* or *substantially* below the corresponding SSSG mean was higher than the year before. The extent of apparent underperformance was most acute in 2016, when the proportion of results that were *significantly* or *substantially* below the corresponding SSSG mean was 62%, the highest in the sample period and almost two standard deviations above the study period average (41%).

Figure 3. Proportion of ACT sample school results that were above, close to and below the corresponding SSSG mean results, all subjects, 2008-2016



There were significant differences in the relative performances of the sample ACT schools. Three schools accounted for 41% of the total number of results from the sample that were *significantly or substantially* above the corresponding SSSG mean. In the other direction, seven schools accounted for 47% of the total number of results in the sample that were *significantly or substantially* below the SSSG mean. Fifty-five per cent (55%) or more of the mean results from these seven schools were *significantly* or *substantially* below the corresponding SSSG mean.

Figures 4-8 show the proportion of ACT sample school results (years 3 and 5) that were above, close to and below the corresponding SSSG mean results by subject area over the period 2008-2016. These results suggest that the apparent underperformance of the sample schools in the NAPLAN tests was not evenly distributed across the subject areas. Judged as group, the NAPLAN performance of the sample ACT schools in reading was slightly below the corresponding SSSG average: 18% of results were *significantly* or *substantially* above the corresponding SSSG mean; and 24% were *significantly* or *substantially* below the corresponding SSSG mean. The relative results for the other subjects were markedly worse. For writing, 9% were *significantly* or *substantially* above and 50% were *significantly* or *substantially* below. For spelling, 6% were *significantly* or *substantially* above and 50% were *significantly* or *substantially* below. For grammar, 13% were *significantly* or *substantially* above and 39% were *significantly* or *substantially* below. For numeracy, 11% were *significantly* or *substantially* above and 42% were *significantly* or *substantially* below.

Figure 4. Proportion of ACT sample school results that were above, close to and below the corresponding SSSG mean results, reading, 2008-2016

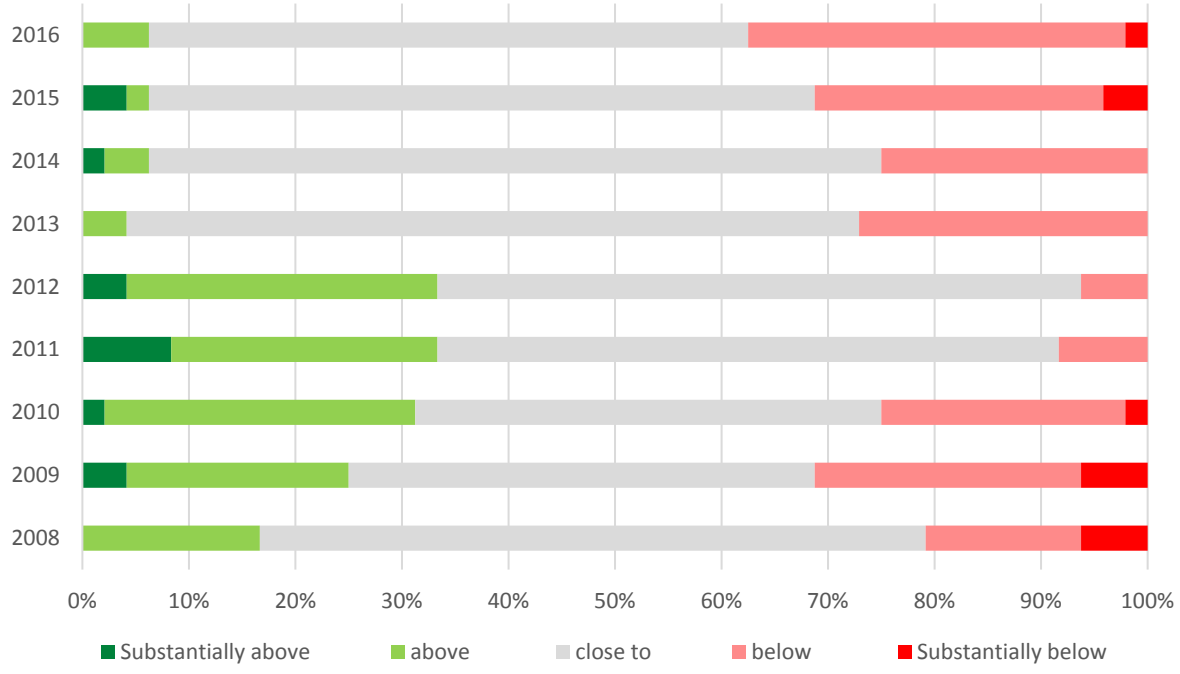


Figure 5. Proportion of ACT sample school results that were above, close to and below the corresponding SSSG mean results, writing, 2008-2016

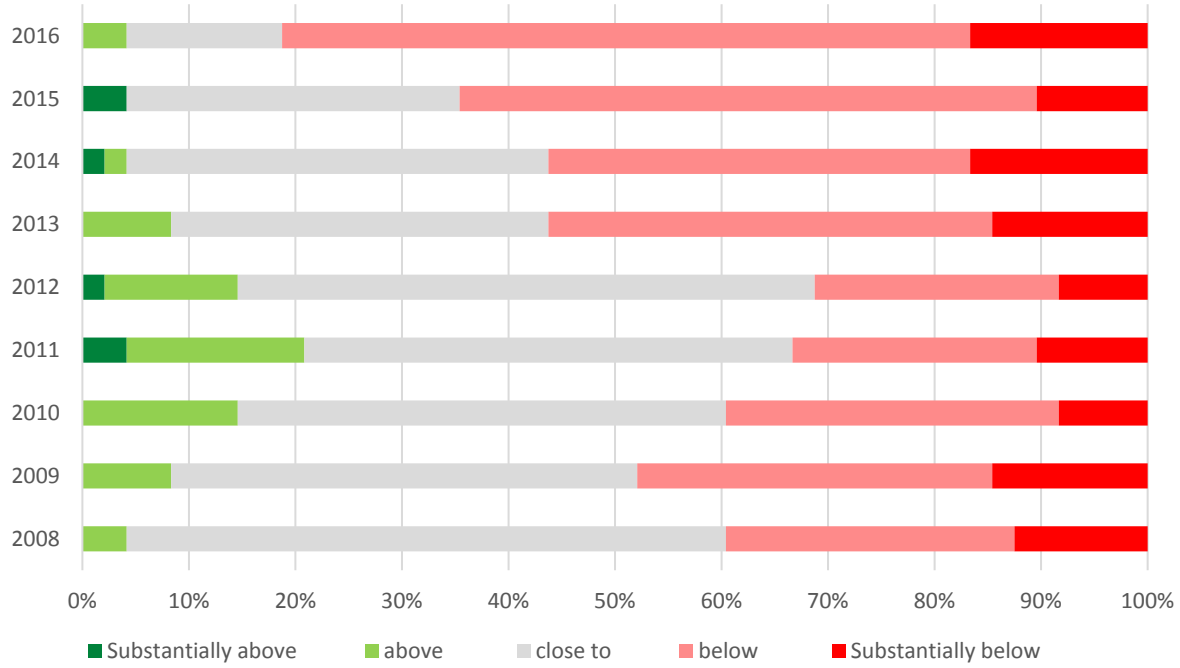


Figure 6. Proportion of ACT sample school results that were above, close to and below the corresponding SSSG mean results, spelling, 2008-2016

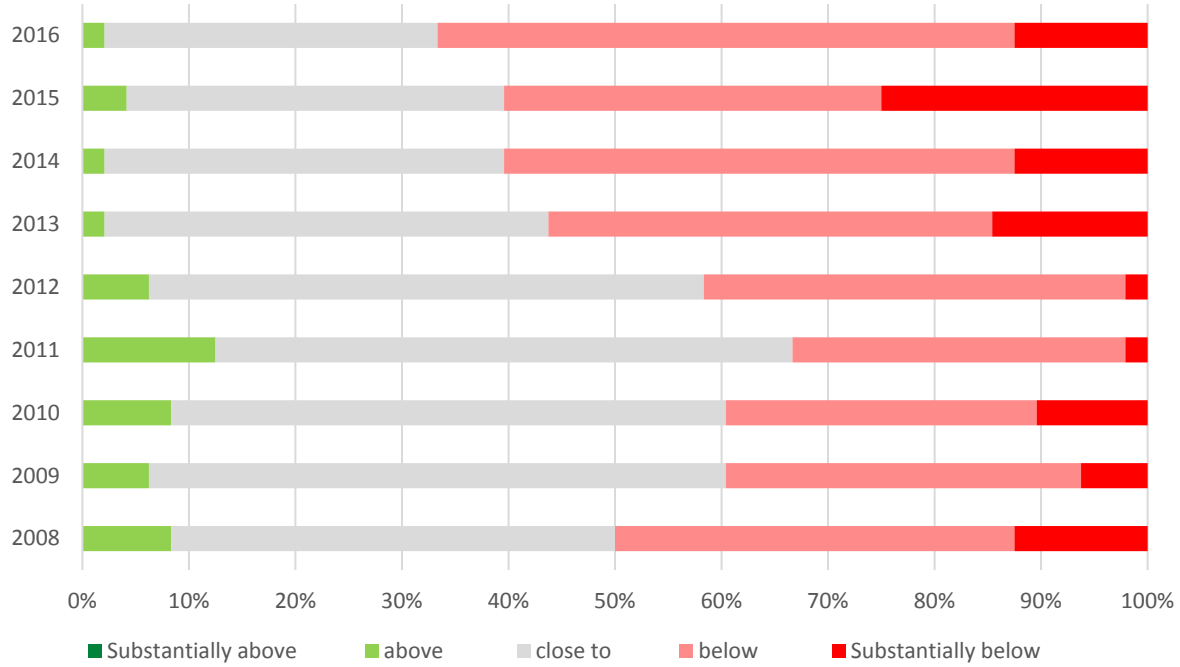


Figure 7. Proportion of ACT sample school results that were above, close to and below the corresponding SSSG mean results, grammar, 2008-2016

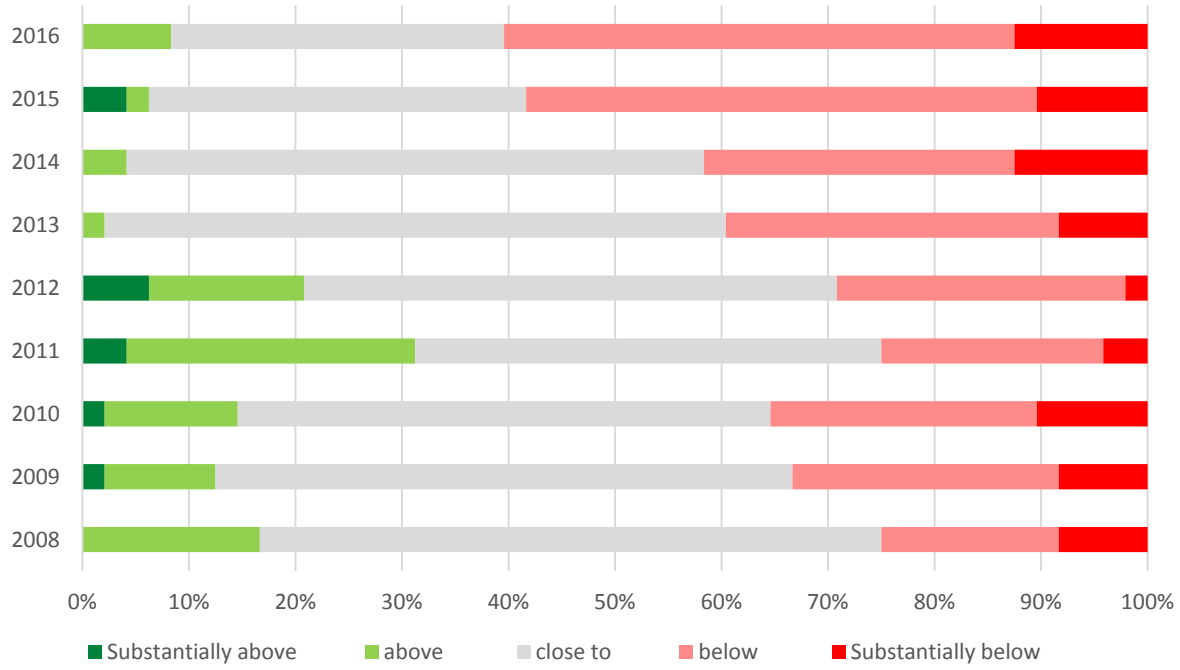
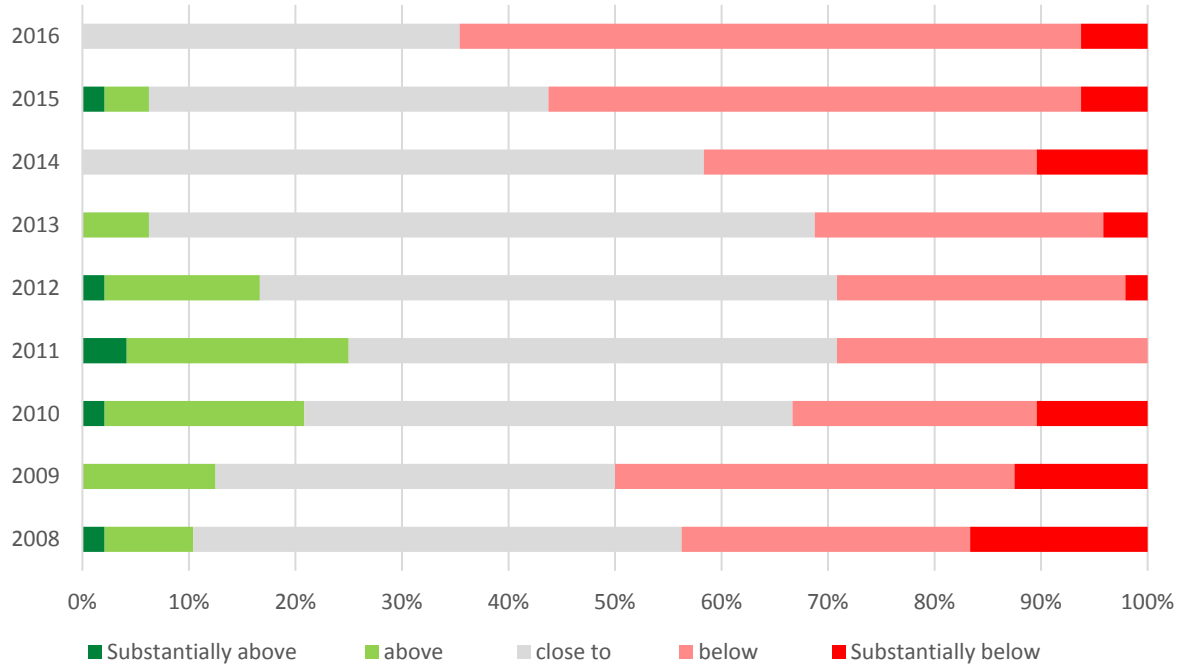


Figure 8. Proportion of ACT sample school results that were above, close to and below the corresponding SSSG mean results, numeracy, 2008-2016



As shown in Table 3, the apparent performance in the subject areas over the sample period as a whole was similar in years 3 and 5, with the exception of grammar. Nine per cent (9%) of the year 3 grammar results were *significantly* or *substantially* above the corresponding SSSG mean, while 43% were

significantly or *substantially* below the SSSG mean. In contrast, 17% of the year 5 grammar results were *significantly* or *substantially* above the corresponding SSSG mean and 35% were *significantly* or *substantially* below the SSSG mean. The only other notable difference was in relation to numeracy, where 38% of the year 3 results were *significantly* or *substantially* below the SSSG mean, while 46% of the year 5 results were *significantly* or *substantially* below the SSSG mean.

Table 3. Proportion of ACT sample school results that were *significantly* or *substantially* above, and *significantly* or *substantially* below, the corresponding SSSG mean, by subject and year, 2008-2016

	***Significantly* and *substantially*:**	**Reading**	**Writing**	**Spelling**	**Grammar**	**Numeracy**
Year 3	above SSSG mean	17%	9%	6%	9%	12%
	below SSSG mean	25%	52%	50%	43%	38%
Year 5	above SSSG mean	19%	10%	6%	17%	10%
	below SSSG mean	23%	48%	49%	35%	46%

Consistent with the above results, the sample ACT schools as a whole generally had a higher proportion of students performing below the national minimum standard than the SSSG average and, in many cases, even had a higher proportion of students performing below the minimum standard than the national average (Tables 4, 5 & 6). The average proportion of students from the sample schools that performed below the national minimum standard was 58% higher than the SSSG average (Table 4). Similarly, in 47% of results, the proportion from the sample schools that performed below the national minimum standard was higher than the SSSG average (Table 5). Moreover, despite the sample schools' high ICSEA values, in 21% of results, the proportion from the sample schools that performed below the national minimum standard was equal to or greater than the national average (Table 6).

Table 4. Proportion of students performing below the national minimum standard, Years 3 & 5, by subject, sample schools, SSSG average and national average

	Reading		**Writing**		**Spelling**		**Grammar**		**Numeracy**	
	Yr. 3	**Yr. 5**	**Yr. 3**	**Yr. 5**	**Yr. 3**	**Yr. 5**	**Yr. 3**	**Yr. 5**	**Yr. 3**	**Yr. 5**
Sample average	1.9%	2.3%	1.5%	3.1%	2.1%	3.1%	2.3%	2.3%	1.5%	1.3%
SSSG average	1.2%	1.7%	0.7%	1.9%	1.2%	1.8%	1.4%	1.8%	1.1%	1.2%
National average	4.1%	5.8%	2.8%	5.9%	5.1%	5.8%	4.8%	5.6%	3.3%	4.6%

Table 5. Instances where the proportion of students in the sample schools that were performing below the national standard was greater than the SSSG average, number and percentage

	Reading		Writing		Spelling		Grammar		Numeracy	
	Yr. 3	Yr. 5	Yr. 3	Yr. 5	Yr. 3	Yr. 5	Yr. 3	Yr. 5	Yr. 3	Yr. 5
Number	102	95	96	121	108	124	110	103	83	76
Percentage of results	47%	44%	44%	56%	50%	57%	51%	48%	38%	35%

Table 6. Instances where the proportion of students in the sample schools that were performing below the national standard was equal to or greater than the national average, number and percentage

	Reading		Writing		Spelling		Grammar		Numeracy	
	Yr. 3	Yr. 5	Yr. 3	Yr. 5	Yr. 3	Yr. 5	Yr. 3	Yr. 5	Yr. 3	Yr. 5
Number	54	27	71	50	42	48	49	33	50	22
Percentage of results	25%	13%	33%	23%	19%	22%	23%	15%	23%	10%

3.2 Government schools

Eighteen (18) of the 24 schools in the sample were government (public) schools, providing a total of 1620 mean results. Seventy-five percent (75%) of the mean results from the ACT government schools were below the corresponding mean from the SSSG, with 46% being *significantly* or *substantially* below (36% were *significantly* below and 10% were *substantially* below) (Table 7). By comparison, only 24% of the mean results were above the corresponding SSSG mean, with a mere 8% being *significantly* or *substantially* above (8% were *significantly* above and 1% were *substantially* above).

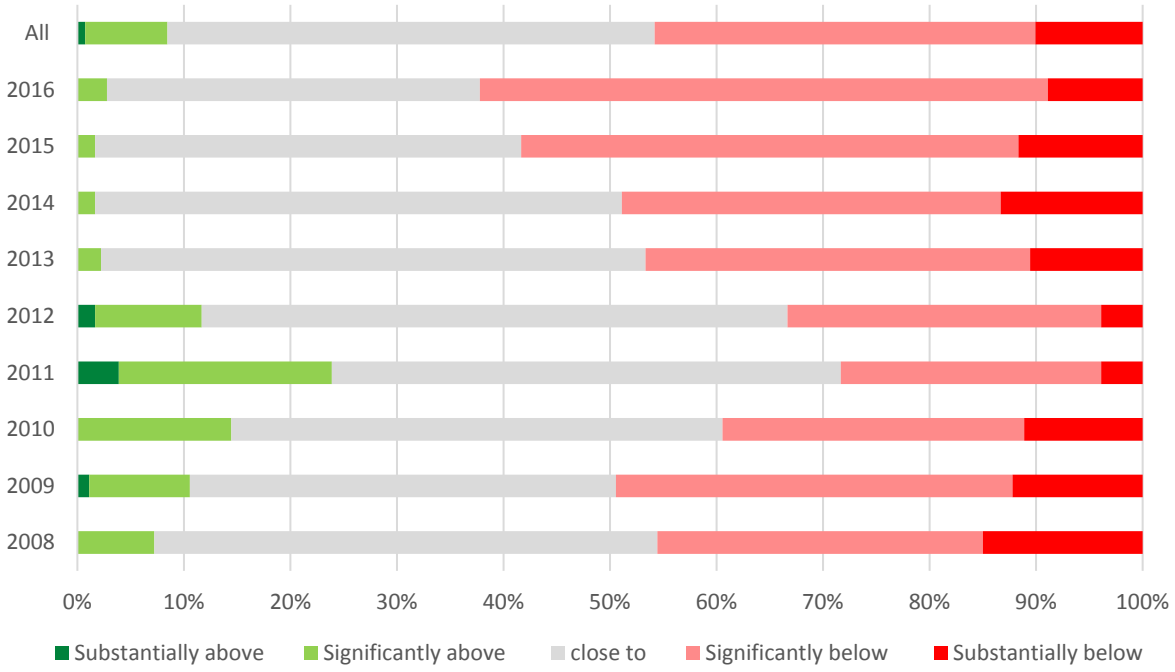
Table 7. Mean results from sampled ACT government schools compared to SSSG means, all subjects, 2008-2016

	No.	%
Results	1620	—
Above SSSG mean	**390**	**24%**
Significantly above	125	8%
Substantially above	12	1%
Significantly or substantially above SSSG mean	**137**	**8%**
Below SSSG mean	**1209**	**75%**
Significantly below	579	36%
Substantially below	163	10%
Significantly or substantially below SSSG mean	**742**	**46%**

Again, the time series results showed a deterioration in the relative performance of the sample ACT government schools since 2011, with the extent of apparent underperformance being most acute in 2016, when 62% of the results were *significantly* or *substantially* below the corresponding SSSG mean

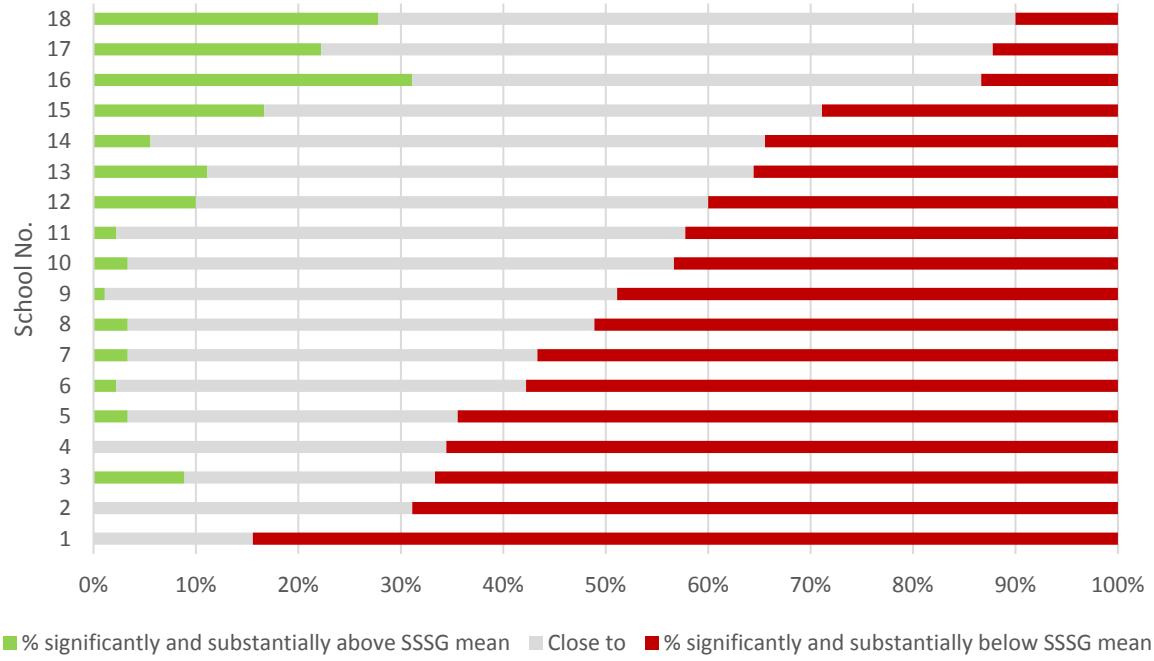
and 3% were *significantly* or *substantially* above the corresponding SSSG mean (Figure 9). By comparison, in 2011, 28% of results were *significantly* or *substantially* below the corresponding SSSG mean and 24% were *significantly* or *substantially* above the corresponding SSSG mean.

Figure 9. Proportion of sample government school results that were above, close to and below the corresponding SSSG mean results, all subjects, 2008-2016



There were notable differences in the relative performances of the sample government schools. More than half (53%) of the government school results that were *significantly* or *substantially* above the comparable SSSG mean came from three schools, two of which have gifted stream programs. Not surprising, these same schools also had a relatively low proportion of *significantly* and *substantially* below results. At the other end of the spectrum, seven schools accounted for 56% of the *significantly* and *substantially* below results from government schools over the study period. Fifty-five per cent (55%) or more of the mean results from these seven schools were *significantly* or *substantially* below the corresponding SSSG mean (Figure 10). Viewed as a group, 66% of the results from these seven schools were *significantly* or *substantially* below the corresponding SSSG mean.

Figure 10. Proportion of sample government school results that were above, close to and below the corresponding SSSG mean results, all subjects, by school, 2008-2016



Figures 11-15 show the proportion of sample government school results (years 3 and 5) that were above, close to and below the corresponding SSSG mean results by subject area over the period 2008-2016. As with the aggregated results, the performance across subjects was not consistent, with the relative performance of the schools being notably better in reading than the other four subject areas. For reading, 16% of results were *significantly* or *substantially* above the corresponding SSSG mean and 23% were *significantly* or *substantially* below the corresponding SSSG mean. The equivalent results in the other subject areas were: for writing, 6% *significantly/substantially* above and 58% *significantly/substantially* below; for spelling, 4% *significantly/substantially* above and 60% *significantly/substantially* below; for grammar, 10% *significantly/substantially* above and 43% *significantly/substantially* below; and for numeracy, 7% *significantly/substantially* above and 45% *significantly/substantially* below.

Figure 11. Proportion of ACT sample government school results that were above, close to and below the corresponding SSSG mean results, reading, 2008-2016

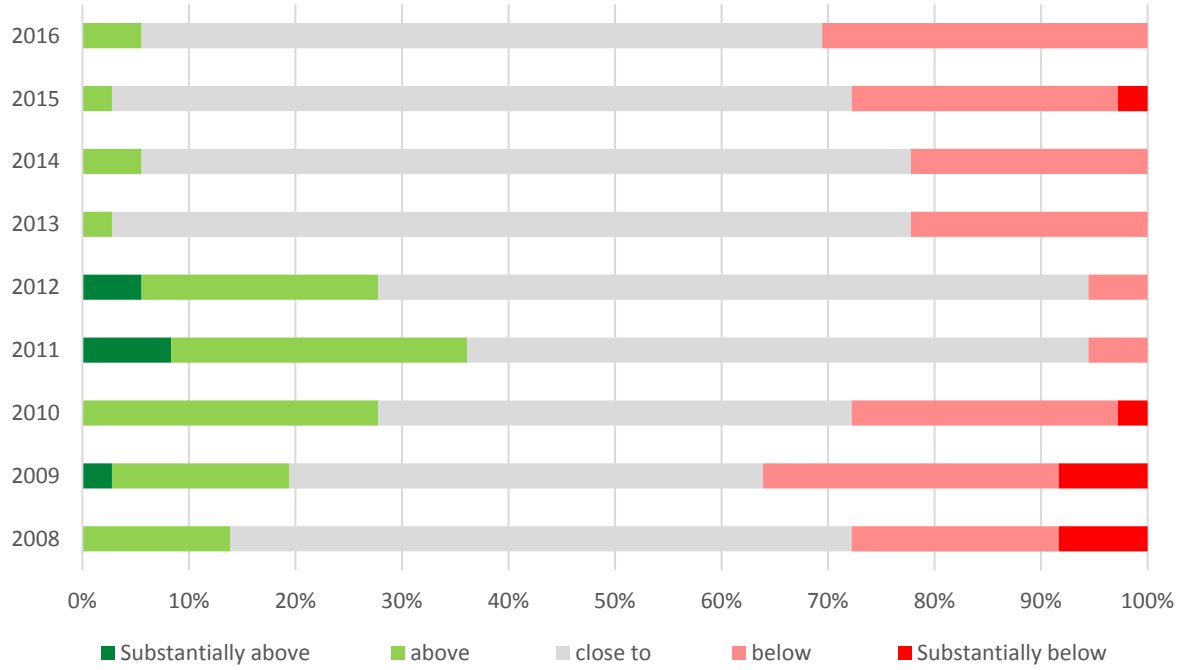


Figure 12. Proportion of ACT sample government school results that were above, close to and below the corresponding SSSG mean results, writing, 2008-2016

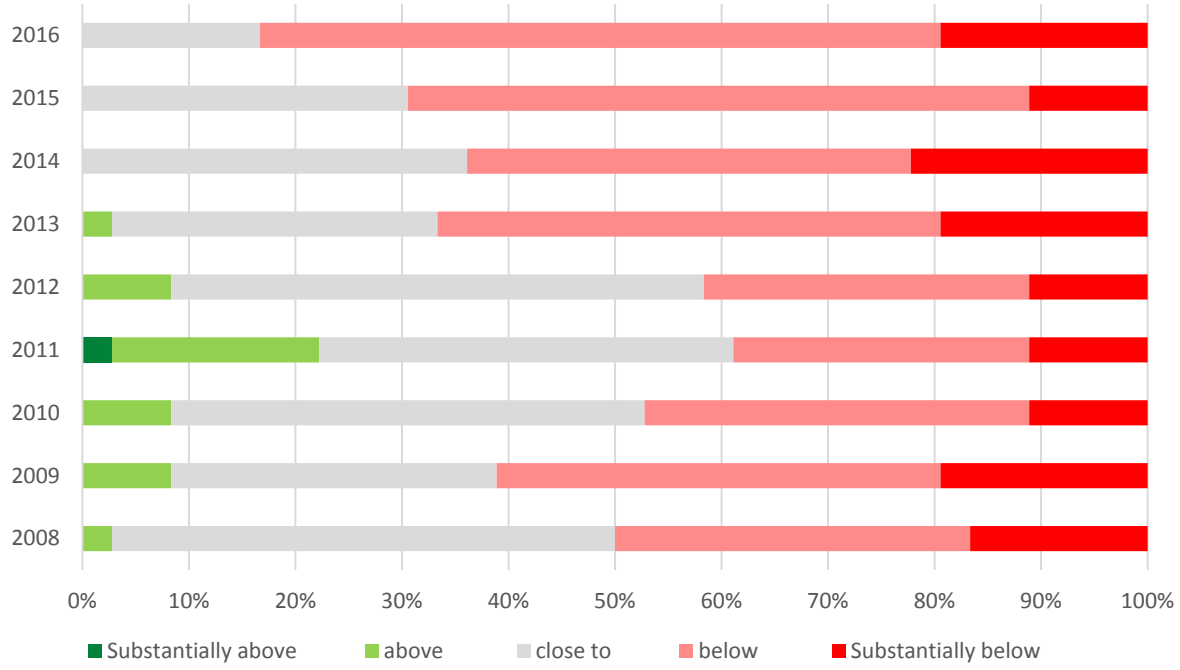


Figure 13. Proportion of ACT sample government school results that were above, close to and below the corresponding SSSG mean results, spelling, 2008-2016

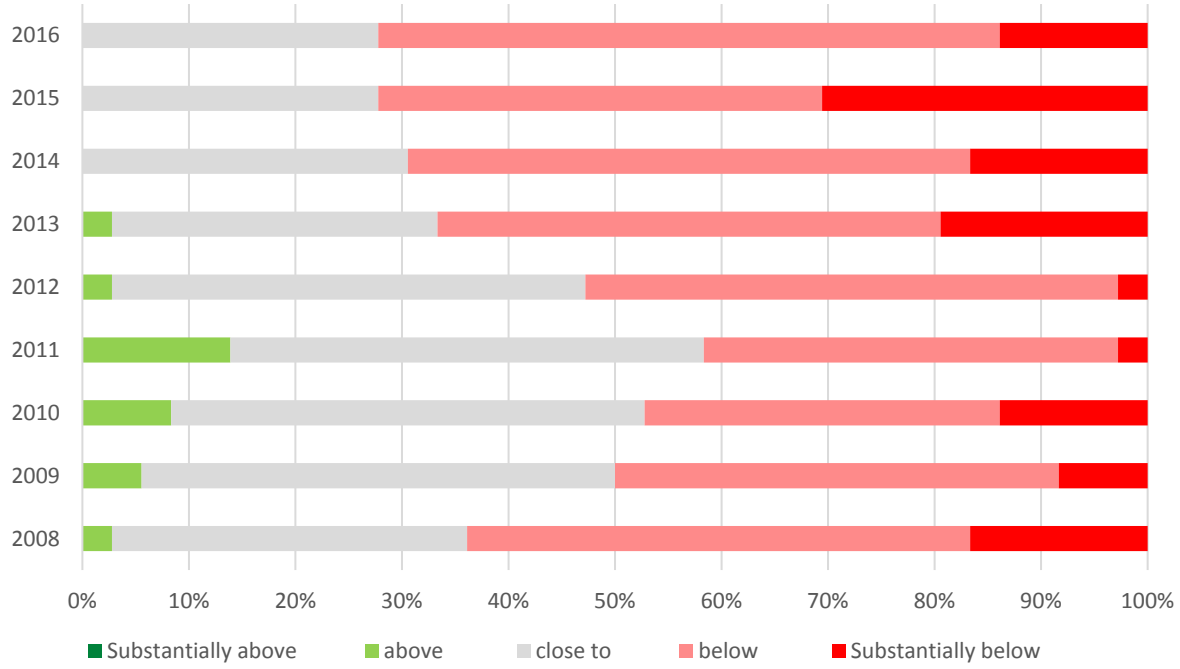


Figure 14. Proportion of ACT sample government school results that were above, close to and below the corresponding SSSG mean results, grammar, 2008-2016

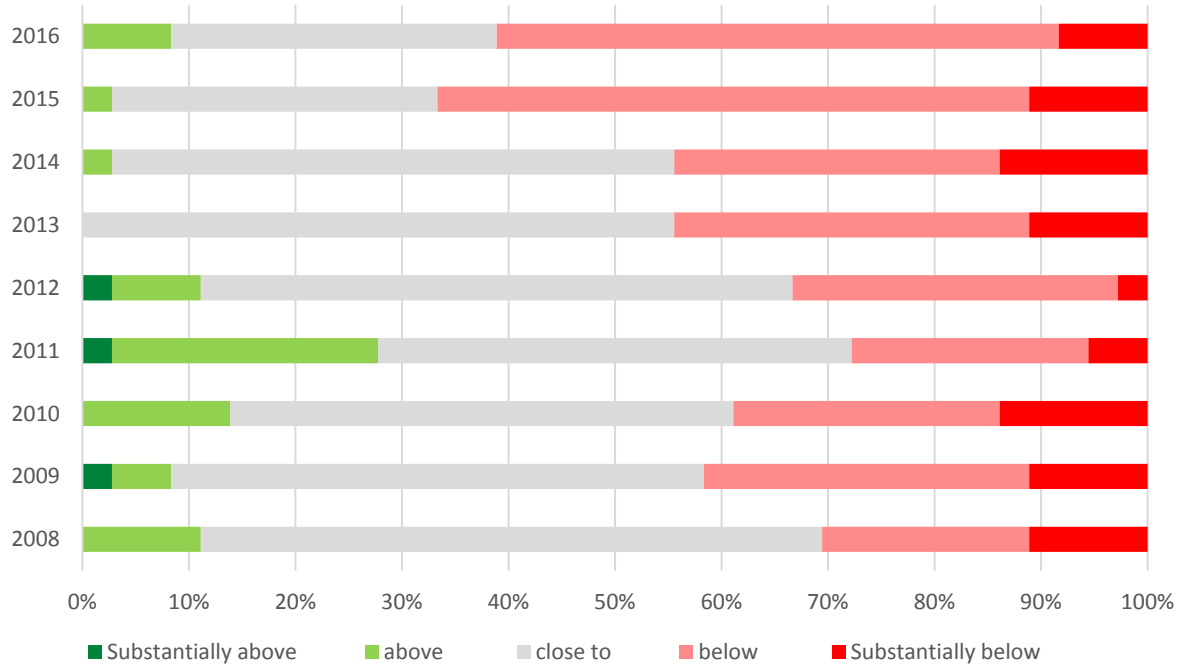
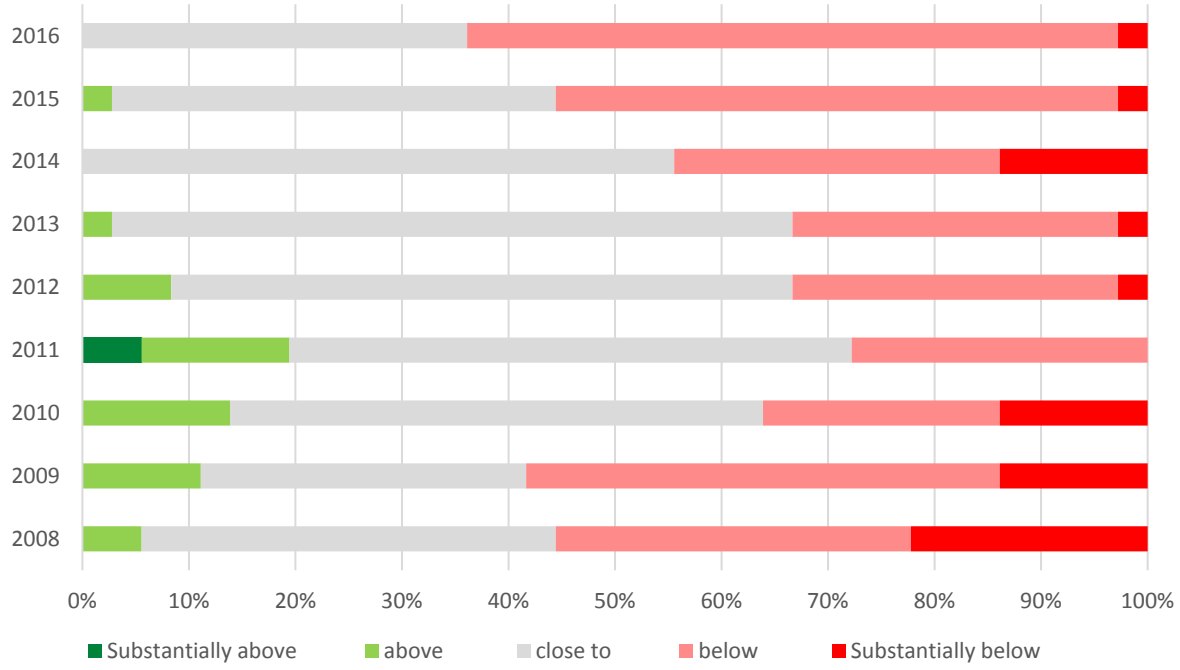


Figure 15. Proportion of ACT sample government school results that were above, close to and below the corresponding SSSG mean results, numeracy, 2008-2016



As with the aggregate school results, the apparent performance in the subject areas over the sample period as a whole were similar in years 3 and 5, with grammar and numeracy being the two subjects with the greatest between year differences (Table 8). For grammar:

- 6% of the year 3 results were *significantly* or *substantially* above the corresponding SSSG mean and 46% were *significantly* or *substantially* below; and
- 13% of the year 5 results were *significantly* or *substantially* above the corresponding SSSG mean and 41% were *significantly* or *substantially* below.

For numeracy:

- 7% of the year 3 results were *significantly* or *substantially* above the SSSG mean and 41% were *significantly* or *substantially* below; and
- 7% of the year 5 results were *significantly* or *substantially* above the SSSG mean and 49% were *significantly* or *substantially* below.

Table 8. Proportion of ACT sample government school results that were *significantly* or *substantially* above, and *significantly* or *substantially* below, the corresponding SSSG mean, by subject and year, 2008-2016

	***Significantly* and *substantially*:**	**Reading**	**Writing**	**Spelling**	**Grammar**	**Numeracy**
Year 3	above SSSG mean	14%	6%	4%	6%	7%
	below SSSG mean	22%	59%	58%	46%	41%
Year 5	above SSSG mean	17%	6%	4%	13%	7%
	below SSSG mean	23%	57%	61%	41%	49%

The sample ACT government schools generally had a higher proportion of students performing below the national minimum standard than the SSSG average. The average proportion of students from the sample government schools that performed below the national minimum standard was 80% higher than the SSSG average (Table 9). In 55% of results, the proportion from the sample government schools that performed below the national minimum standard was higher than the SSSG average (Table 10). In 26% of results, the proportion from the sample government schools that performed below the national minimum standard was equal to or greater than the national average (Table 11).

Table 9. Proportion of students performing below the national minimum standard, Years 3 & 5, by subject, sample government schools, SSSG average and national average

	Reading		**Writing**		**Spelling**		**Grammar**		**Numeracy**	
	Yr. 3	**Yr. 5**	**Yr. 3**	**Yr. 5**	**Yr. 3**	**Yr. 5**	**Yr. 3**	**Yr. 5**	**Yr. 3**	**Yr. 5**
Sample average	2.4%	2.8%	1.8%	3.7%	2.6%	3.8%	2.6%	2.8%	1.9%	1.7%
SSSG average	1.3%	1.8%	0.7%	2.0%	1.3%	1.9%	1.5%	1.9%	1.1%	1.3%
National average	4.1%	5.8%	2.8%	5.9%	5.1%	5.8%	4.8%	5.6%	3.3%	4.6%

Table 10. Instances where the proportion of students in the sample government schools that were performing below the national standard was greater than the SSSG average, number and percentage

	Reading		Writing		Spelling		Grammar		Numeracy	
	Yr. 3	Yr. 5	Yr. 3	Yr. 5	Yr. 3	Yr. 5	Yr. 3	Yr. 5	Yr. 3	Yr. 5
Number	88	84	86	105	96	111	93	93	72	68
Percentage of results	54%	52%	53%	65%	59%	69%	57%	57%	44%	42%

Table 11. Instances where the proportion of students in the sample government schools that were performing below the national standard was equal to or greater than the national average, number and percentage

	Reading		Writing		Spelling		Grammar		Numeracy	
	Yr. 3	Yr. 5	Yr. 3	Yr. 5	Yr. 3	Yr. 5	Yr. 3	Yr. 5	Yr. 3	Yr. 5
Number	49	27	64	48	39	48	42	32	43	22
Percentage of results	30%	17%	40%	30%	24%	30%	26%	20%	27%	14%

3.3 Non-government schools

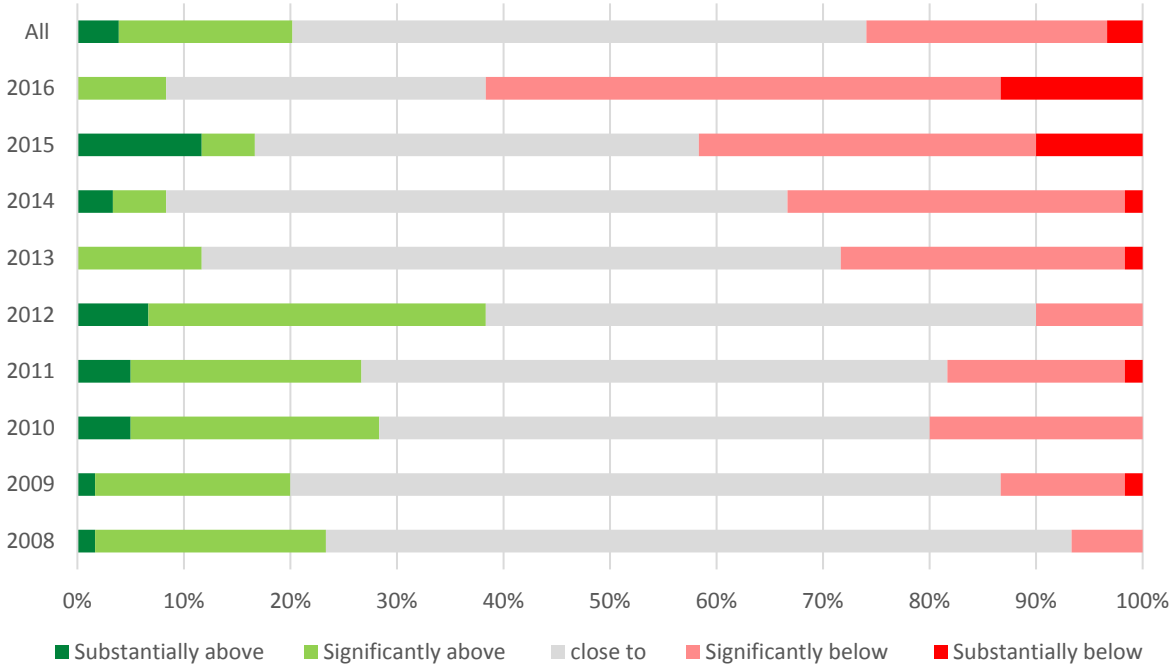
Six (6) of the 24 schools in the sample were non-government (private) schools, providing a total of 540 mean results. Forty-four per cent (44%) of the mean results from the ACT non-government schools were above the corresponding SSSG mean and 55% were below the corresponding SSSG mean (Table 12). Likewise, 20% of the non-government school results were *significantly* or *substantially* above the corresponding SSSG mean (16% were *significantly* above and 4% were *substantially* above) and 26% were *significantly* or *substantially* below the SSSG mean (23% were *significantly* below and 3% were *substantially* below).

Table 12. Mean results from sampled ACT non-government schools compared to SSSG means, all subjects, 2008-2016

	No.	%
Results	540	—
Above SSSG mean	**237**	**44%**
Significantly above	88	16%
Substantially above	21	4%
Significantly or substantially above SSSG mean	**109**	**20%**
Below SSSG mean	**295**	**55%**
Significantly below	122	23%
Substantially below	18	3%
Significantly or substantially below SSSG mean	**140**	**26%**

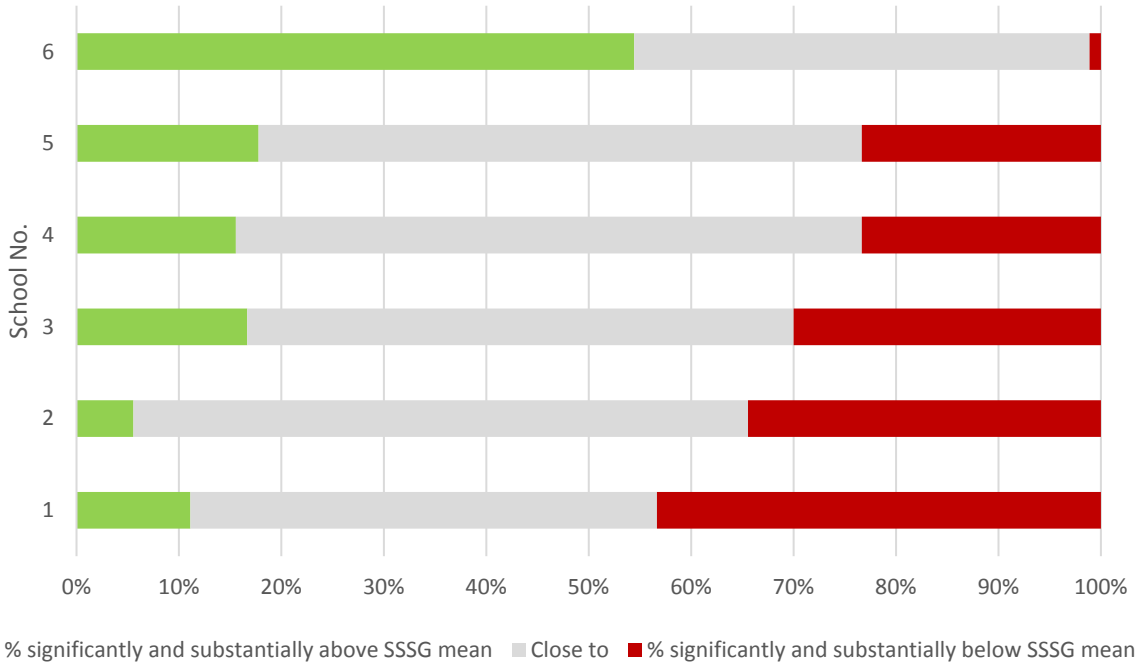
The time series showed a deterioration in the relative performance of the sample non-government schools over the study period (Figure 16). In 2008 and 2009, 23% and 20% of the sample non-government school results respectively were *significantly* or *substantially* above the corresponding SSSG mean and only 7% and 13% were *significantly* or *substantially* below the corresponding SSSG mean. In contrast, in 2016, 0% and 8% of the sample non-government school results respectively were *significantly* or *substantially* above the corresponding SSSG mean and 48% and 13% were *significantly* or *substantially* below the corresponding SSSG mean.

Figure 16. Proportion of sample non-government school results that were above, close to and below the corresponding SSSG mean results, all subjects, 2008-2016



As with the government schools, there were significant differences in the apparent performance between the non-government schools. Forty-five per cent (45%) of non-government school results that were *significantly* or *substantially* above the comparable SSSG mean came from one school. More than 50% of the results from this school were *significantly* or *substantially* above the comparable SSSG mean (Figure 17). In the opposite direction, 43% of the results from one school were *significantly* or *substantially* below the comparable SSSG mean and this school accounted for 28% of the *significantly* and *substantially* below results of the sample non-government schools over the study period.

Figure 17. Proportion of sample non-government school results that were above, close to and below the corresponding SSSG mean results, all subjects, by school, 2008-2016



The apparent performance of the non-government schools was reasonably consistent across subject areas, with the major difference concerning the spread of results (Figures 18-22). For reading, 25% of results were *significantly* or *substantially* above the corresponding SSSG mean and 26% were *significantly* or *substantially* below. The equivalent results in the other subject areas were: for writing, 19% *significantly/substantially* above and 26% *significantly/substantially* below; for spelling, 11% *significantly/substantially* above and 20% *significantly/substantially* below; for grammar, 23% *significantly/substantially* above and 25% *significantly/substantially* below; and for numeracy, 22% *significantly/substantially* above and 32% *significantly/substantially* below.

Figure 18. Proportion of ACT sample non-government school results that were above, close to and below the corresponding SSSG mean results, reading, 2008-2016

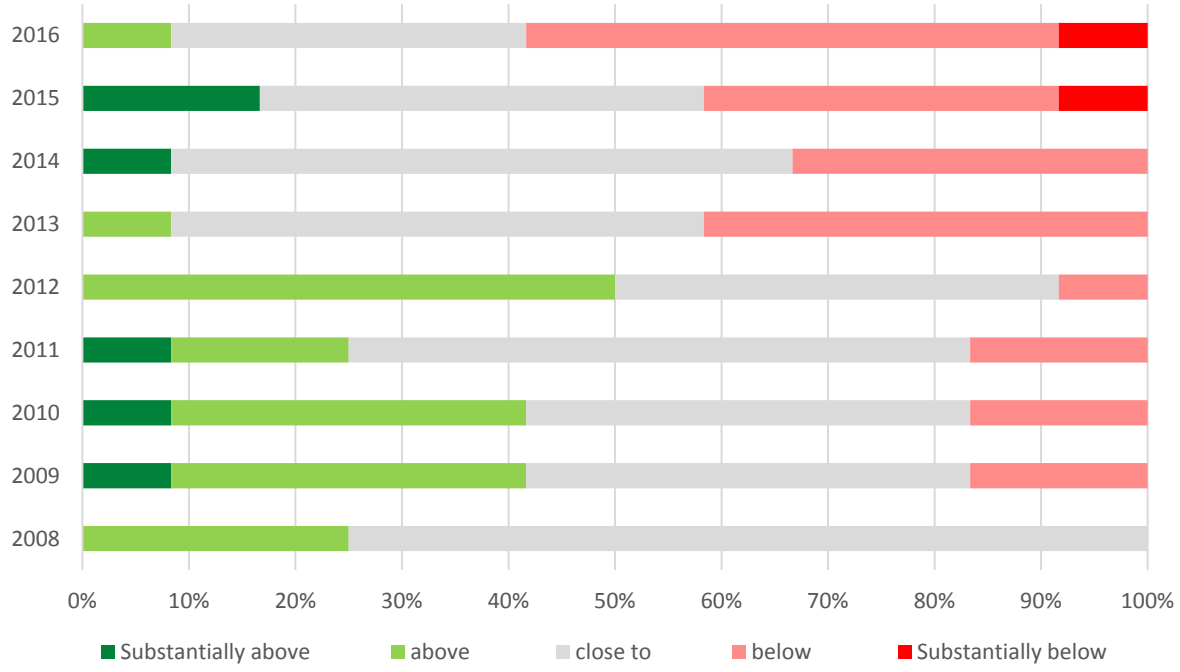


Figure 19. Proportion of ACT sample non-government school results that were above, close to and below the corresponding SSSG mean results, writing, 2008-2016

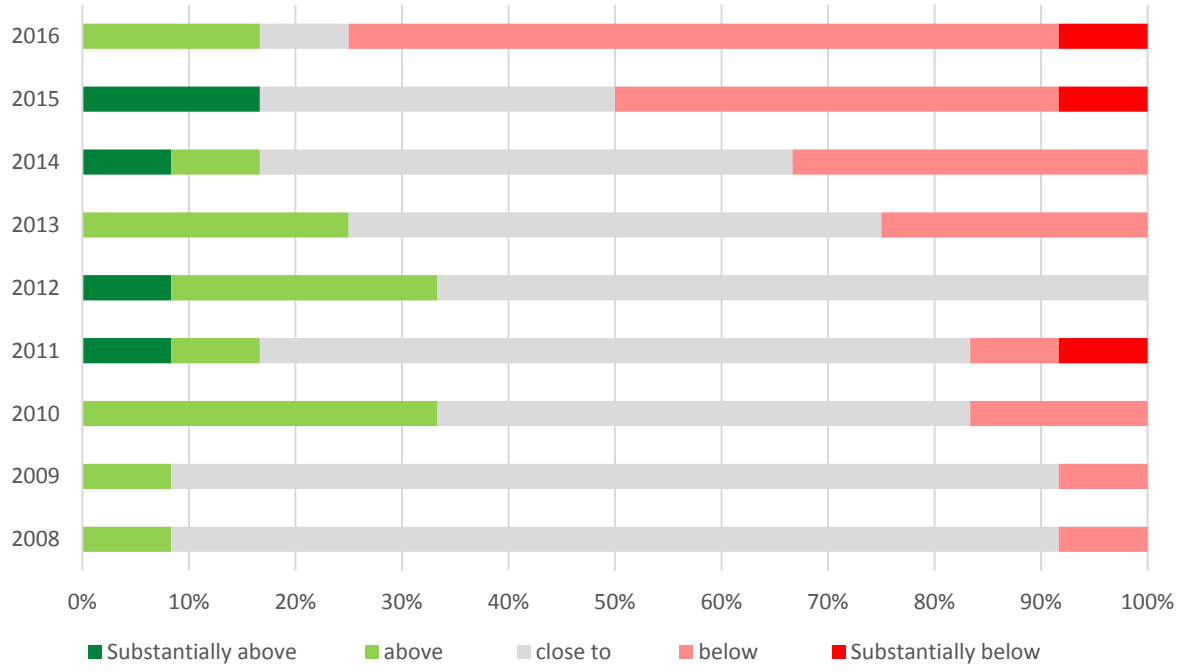


Figure 20. Proportion of ACT sample non-government school results that were above, close to and below the corresponding SSSG mean results, spelling, 2008-2016

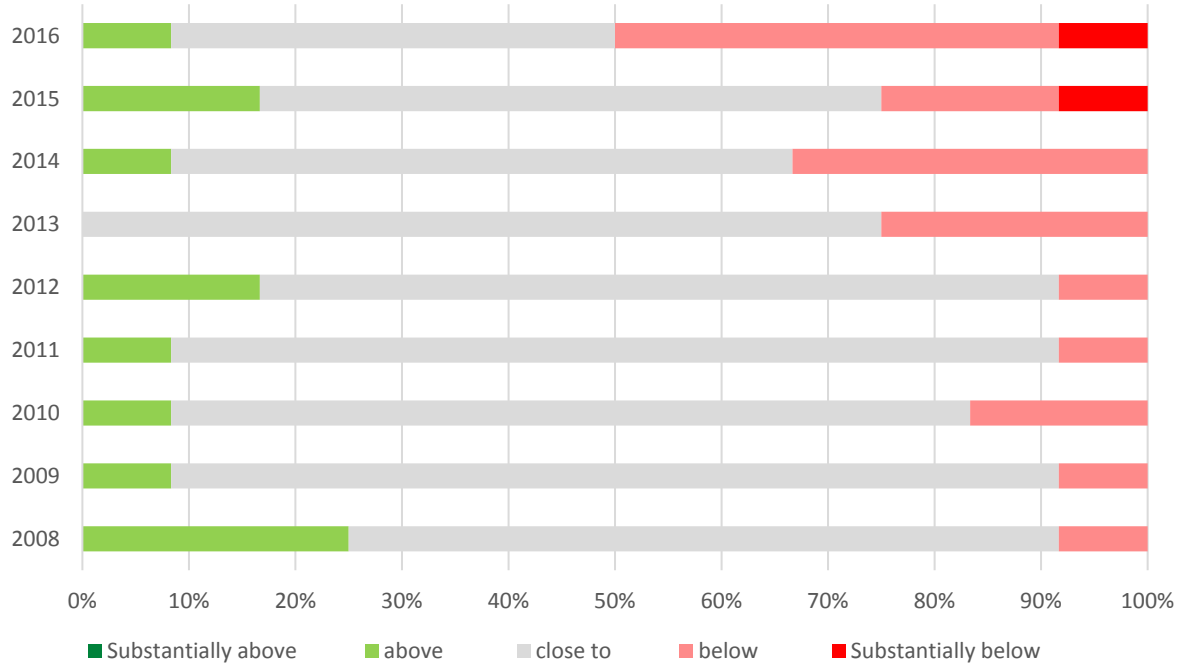


Figure 21. Proportion of ACT sample non-government school results that were above, close to and below the corresponding SSSG mean results, grammar, 2008-2016

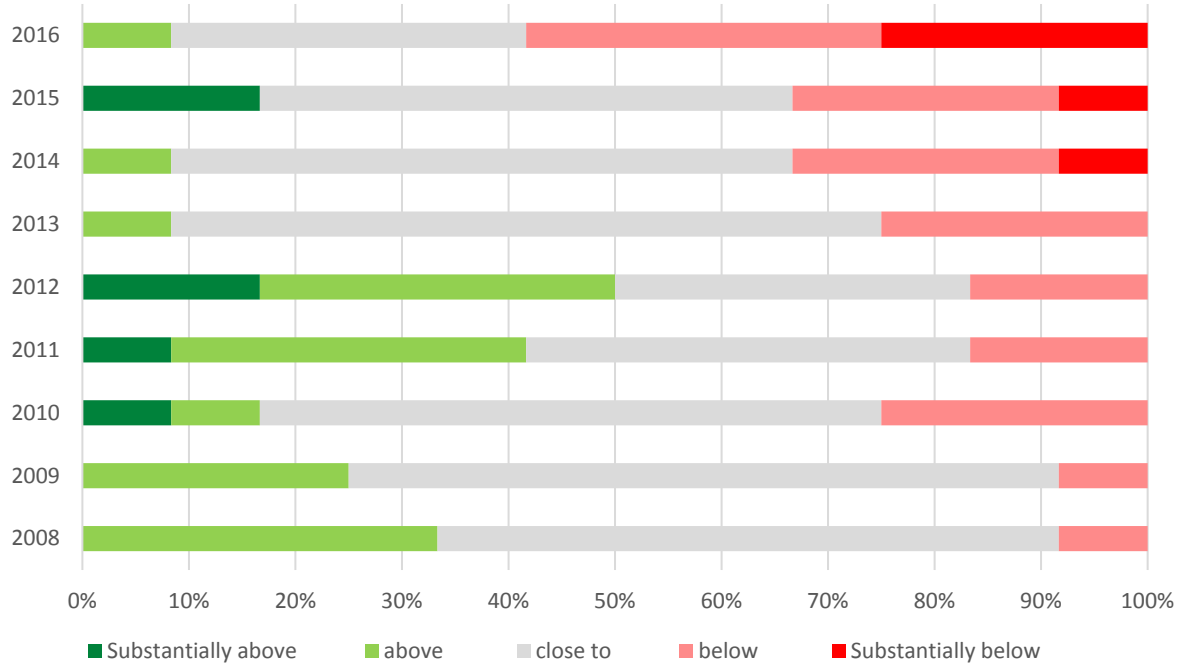
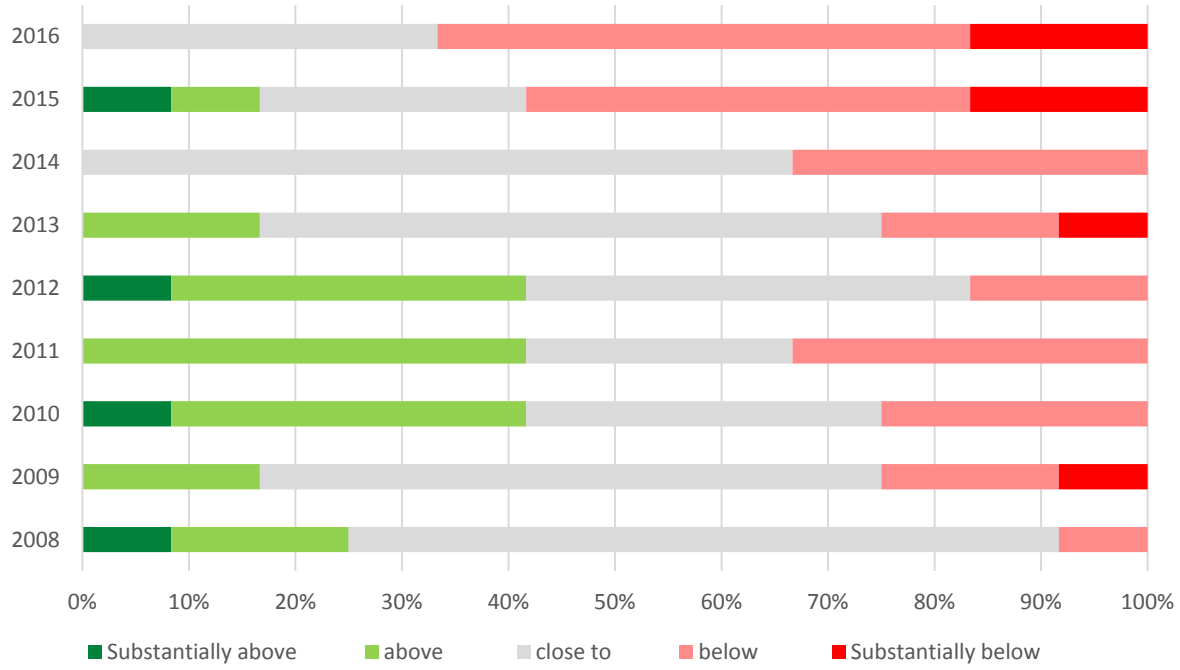


Figure 22. Proportion of ACT sample non-government school results that were above, close to and below the corresponding SSSG mean results, numeracy, 2008-2016



For the sample non-government schools, the relative performance in the year 5 NAPLAN tests across the sample period was generally better than the relative performance in the year 3 NAPLAN tests, except in numeracy (Table 13). For reading, writing, spelling and grammar, on average across the study period, the proportion of results that were *significantly* or *substantially* above the SSSG mean was higher in the year 5 results than the year 3 results and/or the proportion of results that were *significantly* or *substantially* below the SSSG mean was lower in the year 5 results than in the year 3 results. This did not hold for the numeracy results, where:

- 24% of the year 3 results were *significantly* or *substantially* above the corresponding SSSG mean and 30% were *significantly* or *substantially* below; and
- 20% of the year 5 results were *significantly* or *substantially* above the corresponding SSSG mean and 35% were *significantly* or *substantially* below.

Table 13. Proportion of ACT sample non-government school results that were *significantly* or *substantially* above, and *significantly* or *substantially* below, the corresponding SSSG mean, by subject and year, 2008-2016

	***Significantly* and *substantially*:**	**Reading**	**Writing**	**Spelling**	**Grammar**	**Numeracy**
Year 3	above SSSG mean	24%	17%	11%	19%	24%
	below SSSG mean	31%	33%	28%	33%	30%
Year 5	above SSSG mean	26%	22%	11%	28%	20%
	below SSSG mean	20%	19%	13%	17%	35%

Not surprisingly given the above results, the results in bands for the sampled ACT non-government schools were noticeably different from the aggregated and government school results. The key findings were as follows.

- The average proportion of students from the sample non-government schools that performed below the national minimum standard was 26% lower than the SSSG average (Table 14).
- In only 23% of results, the proportion from the sample non-government schools that performed below the national minimum standard was higher than the SSSG average (Table 15).
- In only 6% of results, the proportion from the sample non-government schools that performed below the national minimum standard was equal to or greater than the national average (Table 16).

Table 14. Proportion of students performing below the national minimum standard, Years 3 & 5, by subject, sample non-government schools, SSSG average and national average

	Reading		Writing		Spelling		Grammar		Numeracy	
	Yr. 3	Yr. 5	Yr. 3	Yr. 5	Yr. 3	Yr. 5	Yr. 3	Yr. 5	Yr. 3	Yr. 5
Sample average	0.6%	0.9%	0.6%	1.1%	0.7%	0.9%	1.3%	0.9%	0.5%	0.4%
SSSG average	1.0%	1.4%	0.6%	1.5%	0.9%	1.5%	1.1%	1.4%	0.9%	0.9%
National average	4.1%	5.8%	2.8%	5.9%	5.1%	5.8%	4.8%	5.6%	3.3%	4.6%

Table 15. Instances where the proportion of students in the sample non-government schools that were performing below the national standard was greater than the SSSG average, number and percentage

	Reading		Writing		Spelling		Grammar		Numeracy	
	Yr. 3	Yr. 5	Yr. 3	Yr. 5	Yr. 3	Yr. 5	Yr. 3	Yr. 5	Yr. 3	Yr. 5
Number	14	11	10	16	12	13	17	10	11	8
Percentage of results	26%	20%	19%	30%	22%	24%	31%	19%	20%	15%

Table 16. Instances where the proportion of students in the sample non-government schools that were performing below the national standard was equal to or greater than the national average, number and percentage

	Reading		Writing		Spelling		Grammar		Numeracy	
	Yr. 3	Yr. 5	Yr. 3	Yr. 5	Yr. 3	Yr. 5	Yr. 3	Yr. 5	Yr. 3	Yr. 5
Number	5	0	7	2	3	0	7	1	7	0
Percentage of results	9%	0%	13%	4%	6%	0%	13%	2%	13%	0%

4. Discussion

Contrary to the perception created by the commentary around the ACT's average NAPLAN results relative to those from other jurisdictions, the findings demonstrate that, as a whole, high SES ACT primary schools have tended to perform below the level of their SSSGs in NAPLAN tests over the period 2008-2016. The apparent underperformance of ACT schools is mostly attributable to government schools. Government schools performed substantially worse than non-government schools when judged on the basis of comparable SSSG outcomes. Forty-six per cent (46%) of the mean results from government schools were *significantly* or *substantially* below the corresponding SSSG mean. In contrast, 26% of the mean results from non-government schools were *significantly* or *substantially* below the corresponding SSSG mean.

Consistent with this, 84% of the mean results that were *significantly* or *substantially* below the

corresponding SSSG mean came from government schools, whereas government schools made up only 75% of the sample. Government school results for low performing students were particularly alarming. The average proportion of students from the sample government schools that performed below the national minimum standard was 80% higher than the SSSG average. In addition, in 26% of cases, the proportion from the sample government schools that performed below the national minimum standard was equal to or greater than the national average.

A large proportion of the government results that were significantly above the corresponding SSSG mean came from two schools with gifted streams. Together, these two schools accounted for 33% of the *significantly* and *substantially* above results from government schools. One other government school's relative results stood out: 31% of its average results were *significantly* or *substantially* above the corresponding SSSG mean, the highest proportion of any government school in the sample and second highest in the entire sample. Combined, these three government schools accounted for 53% of the *significantly* and *substantially* above results from government schools, even though they made up only 17% of the government school sample. When these schools are removed from the government school sample:

- the proportion of mean results from government schools that were *significantly* or *substantially* above the corresponding SSSG mean falls from 8% to 5%; and
- the proportion of mean results from government schools that were *significantly* or *substantially* below the corresponding SSSG mean rises from 46% to 53%.

Consistent with these results, the apparent underperformance amongst government schools was also reasonably concentrated. Seven schools accounted for 56% of the *significantly* or *substantially* below results recorded over the study period amongst government schools, even though these schools made up only 39% of the government school sample. Only 3% of the mean results from these schools were *significantly* or *substantially* above the corresponding SSSG mean.

Judged as group, the NAPLAN performance of the six non-government schools was slightly below average. Forty-four percent (44%) of the mean results from the non-government schools were above the corresponding SSSG mean and 55% were below. Most relevantly, 20% of the non-government school results were *significantly* or *substantially* above the corresponding SSSG mean and 26% were *significantly* or *substantially* below.

The performance of one school materially influenced the results from the non-government school group. Only one of this school's 90 mean results was *significantly* below its SSSG's mean; none were *substantially* below. The school also accounted for 45% of the *significantly* and *substantially* above results from non-government schools. With this school removed from the sample, the proportion of non-government school results that were *significantly* or *substantially* above the corresponding SSSG mean falls from 20% to 13%, and the proportion that were *significantly* or *substantially* below the corresponding SSSG mean rises from 26% to 31%.

The results raise a number of important policy questions, including the following.

- Why do high SES ACT government schools appear to be underperforming in NAPLAN tests compared to their SSSGs?
- What explains the apparent relatively good performance of some government schools? The

results from those that have selective streams may be attributable to having more academically gifted students but what about the other high performing government school?

- What explains the apparent relatively good performance of some non-government schools and apparent underperformance amongst others?
- What explains the differences in the relative performance of the sample schools across subject areas, particularly the stronger performances in reading and weaker performances in spelling and writing?

All of these issues warrant further inquiry. However, due to space restrictions, the remainder of the discussion focuses on the first of these.

There are many possible reasons for the apparent underperformance of the government schools in the sample, including the following (this list is non-exhaustive).

- The ICSEA values and the SSSG groupings may be incorrect, meaning the sampled government schools may be being inappropriately compared with higher SES schools.
- The teaching methods employed in the sampled ACT government schools may be worse than in the SSSG.
- The sampled government schools may have fewer resources than the majority of schools in the SSSGs.
- The sampled government schools may not be allocating their resources as efficiently as other schools in the SSSGs.
- The sampled government schools might have a higher proportion of 'high needs' students relative to the majority of schools in the SSSGs, and fewer resources to devote to them.
- The sampled government schools may have lower expectations of student performance than schools in the SSSGs.
- There may be material differences in the employment conditions and management arrangements in the sampled government schools compared to those in the SSSGs, which could be adversely affecting the quality of the teaching.
- Schools in the SSSGs may be engaging in unconscionable conduct (e.g. narrowing the curriculum in order to 'teach to the test'), while the sampled government schools may not be.
- The results from the sampled government schools may be unrepresentative due to high withdrawal rates.[21]
- Prior to the full implementation of the national curriculum in English and mathematics in 2013, the ACT's curriculum may not have aligned well with what is covered in the NAPLAN tests, thereby leaving students from the sampled government schools at a disadvantage over the period 2008 to 2012.[22]

[21] The ACT has the highest withdrawal rate in Australia, which may have an adverse impact on the accuracy of the Territory's results. See also J. Anderson and C. Boyle (2015), 'Declining NAPLAN participation rates likely skewing the data', *The Conversation*, 10 June. Available at: https://theconversation.com/declining-naplan-participation-rates-are-likely-skewing-the-data-42821 (23 May 2017).

[22] The first three phases of the Australian Curriculum covering English, mathematics, science, and history were implemented in ACT government schools over the period 2011-2013. Prior to this, these subjects were taught in accordance with the ACT's curriculum framework 'Every Chance to Learn', which is still used as the curriculum framework for other subjects not yet covered by the Australian Curriculum. It is possible that the

- There may be less support for NAPLAN testing amongst the ACT's government school parent body, which may be having an impact on the perceived relative importance of the test by teachers and administrators.[23]

It is beyond the scope of this report to analyse all of these potential factors. We focus here on the two we believe are likely to be amongst the most important: the ICSEA and SSSG groupings; and deficiencies in teaching methods.

4.1 ICSEA and SSSG deficiencies

The ICSEA has twice been refined to improve the accuracy of the score as a measure of relative educational advantage. The most notable refinement concerned the source of the student-level data. The 2008 and 2009 ICSEA values were calculating using Australian Bureau of Statistics (ABS) Census data on the characteristics of the households near where students lived. This was changed in 2010. [24] Since then, the ICSEA calculations have predominantly used family background information provided to schools by parents and carers. Over the period 2010-2011, the ICSEA scores also included an adjustment to account for students from a non-English speaking background whose parents had a level of education of Year 9 or below. This was removed in 2012.[25]

Despite these and other related refinements, it remains possible that there are some potentially important considerations that are either inaccurately or not currently accounted for in the calculation of a school's ICSEA score and in the development of its SSSG. One of these is resources. ICSEA values do not account for resource differences between schools. This could be justified on the grounds that the weight of evidence from educational research suggests that the link between resources and educational outcomes is relatively weak.[26] An increase in per-pupil spending is associated with only

'Every Chance to Learn' framework and its key learning areas (KLAs) and essential learning areas (ELAs) did not cover the same material as the NAPLAN tests and, consequently, ACT students were disadvantaged compared to students from other jurisdictions (assuming the curricula in their jurisdictions were more aligned with the content of the NAPLAN tests). See ACT Education and Training Directorate (2017), 'Curriculum'. Available at: http://www.det.act.gov.au/teaching_and_learning/curriculum_programs (23 May 2017).

[23] The fact that the ACT has the highest NAPLAN withdrawal rate in Australia may highlight a higher level of philosophical objection to NAPLAN testing amongst the ACT parent body.

[24] ACARA (undated), *Calculating ICSEA values*, ACARA, Sydney. Available at: http://www.acara.edu.au/verve/_resources/Calculating_ICSEA_Values.pdf (23 May 2017). See also G. Barnes (undated), *Report on the generation of the 2010 Index of Community Socio-Educational Advantage (ICSEA)*, ACARA, Sydney. Available at: https://acaraweb.blob.core.windows.net/resources/ICSEA_Generation_Report.pdf (23 May 2017).

[25] ACARA (2013), *Guide to understanding 2012 Index of Community Socio-educational Advantage values*, ACARA, Sydney. Available at: https://acaraweb.blob.core.windows.net/resources/Guide_to_understanding_2012_ICSEA_values.pdf (23 May 2017).

[26] E. Hanushek (1981), 'Throwing money at schools', *Journal of Policy Analysis and Management* 1(1), 19-41; E. Hanushek (1997), 'Assessing the Effects of School Resources on Student Performance: An Update', *Educational Evaluation and Policy Analysis* 19(2), 141-164; L. Hedges, R. Laine and R. Greenwald (1994), 'Does money matter? A meta-analysis of the effects of differential school inputs on student outcomes', *Educational Researcher*, 23(3), 5–14; S. Lamb, R. Rumberger, D. Jesson and R. Teese (2004), *School Performance in Australia: Results from Analyses of School Effectiveness*, Report for the Victorian Department of Premier and Cabinet, Centre for Post-Compulsory Education and Lifelong Learning, University of Melbourne, Parkville; and D. Cobb-Clark and N. Jha (2013), *Educational Achievement and the Allocation of School Resources,* Melbourne Institute Working Paper Series, Working Paper No. 27/13, University of Melbourne, Parkville. For an overview of the international and domestic research, see P. Miller and D. Voon (2011), 'Lessons from My School', *The*

modest improvements in test scores. Notwithstanding this, it is plausible that wealthier schools may have an educational advantage over poorer schools because the former are likely to have a greater capacity to engage in practices that are known to lift student performance. For example, they may be able to employ higher calibre teachers, to employ a greater number of ancillary teachers to assist in specific tasks, and to undertake more and higher quality teacher training. In this study, the per student net recurrent income of schools in 2016 ranged from $10,360 to $20,150. As could be expected, the greatest variability in incomes was within the private sector ($12,341 to $20,150) but, perhaps surprisingly, there was also considerable variability in the public sector, with per student incomes ranging from $10,360 to $16,728.

A second issue associated with the ICSEA values is that the proportion of 'high needs' children in the student population is not currently accounted for in the ICSEA calculation. As discussed, the current equation used to calculate ICSEA scores accounts for the proportion of low SES and Indigenous children in the student population only. Adjustments are not made to account for the proportion of students at a school that have persistent psychological issues and/or behavioral problems that impact on their learning and sometimes the learning of others. Nor do the ICSEA scores account for the proportion of students at a school with learning difficulties. ICSEA scores also no longer account for schools with a high proportion of students from non-English speaking backgrounds who have been in Australia for more than 12 months.

We were unable to find any evidence concerning the relative proportions of 'high needs' children at the sampled government schools and in their SSSGs. However, there is evidence the sampled government schools have relatively high proportions of children from non-English speaking backgrounds. On average, in 2016, 33% of the students at the sampled government schools had a language background other than English (LBOTE), with the range stretching from 14% to 61%. Two of the sample government schools also host Introductory English Centres, which provide intensive English language tuition for recent immigrants over a period of two school terms. While being from a language background other than English may not have a substantive impact on educational outcomes in the long-term, it is possible that, in the short-term, it does make a substantive difference to educational outcomes. If this is the case, schools that cater for these students will be at a disadvantage to those that do not.

A third possible factor that is not accounted for in the ICSEA calculation is the proportion of children in the student population that are academically gifted. Schools that have a large proportion of gifted students (for example, because the schools are academically selective, have gifted streams or provide significant additional 'in class' programming support) are likely to outperform otherwise comparable SES schools. This is illustrated in the results above, where government schools with gifted streams performed relatively well in comparison to schools without such streams. For some schools, the failure to account for the proportion of academically gifted children in the student population may make SSSG comparisons misleading.

A fourth possibility is that the ICSEA values may not be accurately capturing the impact of SES on the levels of educational achievement in Years 3 and 5 because of deficiencies in the family background

Australian Economic Review 44(4), 366-386. For an alternative perspective, see A. Krueger (2003), 'Economic Considerations and Class Size', *The Economic Journal* 13, F34-F63; and J. Dewey, T. Husted and L. Kenny (2000), 'The ineffectiveness of school inputs: A product of misspecification', *Economics of Education Review* 19, 27-45.

information that is used to calculate the values (i.e. it is too coarse and is not capturing a sufficient range of factors that contribute to SES-related educational advantage and disadvantage) and/or weaknesses in the statistical relationships between SES and educational achievement that are used to derive the values. For example, it might be the case that significant differences between the backgrounds of students from households that are identified as being low SES are not being adequately accounted for in the ICSEA calculation because the family background information is not capturing the relevant differences.

For these issues to help explain the apparent underperformance of the sample government schools, there would have to be a reason why they would affect high SES ACT government schools more than the other schools in the relevant SSSGs. To investigate this, we analysed the 2014 ICSEA scores and distribution of students across the SES quartiles from the seven sample government schools that had the weakest relative performance compared to their SSSGs. These data were then compared to the equivalent information from their SSSGs. The SSSG data were derived from a random sample of 25% of the schools in each SSSG. As Table 17 shows, while the ICSEA scores of the seven sample government schools and the mean ICSEA score of their SSSGs were similar, the distributions of the students across the SES quartiles were significantly different. With the exception of one school (School 3), all of the schools had a greater proportion of students in the bottom quartile than the mean from their SSSG. In five of the seven schools, the proportion of students in the bottom quartile was more than double the mean from their SSSG. Five of the schools also had the highest proportion of students in the bottom quartile of any school in their SSSG samples (Schools 1, 2, 4, 5 and 6). The data suggest that the distribution of students at the seven government schools is relatively skewed to the bottom and top quartiles compared to the other schools in their SSSGs.[27]

[27] An explanation for this might lie in the geographic distribution of public housing in the ACT. There is a long-standing ACT government policy that seeks to avoid the concentration of public housing and disadvantage in particular locations. The implementation of this policy has resulted in a more even distribution of disadvantaged households across the Territory than occurs in most other Australian jurisdictions.

Table 17. ICSEA scores and SES quartile distributions, selected sample government schools vs. SSSG means, 2014 (margins of error at 95% confidence level shown in parenthesis)

School	ICSEA	Distribution			
		Bottom	Middle 1	Middle 2	Top
School 1	1153	4.0%	6.0%	18.0%	71.0%
SSSG	1155 (±1.0)	1.6% (±0.4%)	6.7% (±0.5%)	22.5% (±0.7%)	69.2% (±0.9%)
School 2	1134	6.0%	8.0%	20.0%	67.0%
SSSG	1134 (±0.6)	2.5% (±0.4%)	9.8% (±0.4%)	27.9% (±0.9%)	60.1% (±0.8%)
School 3	1142	2.0%	10.0%	22.0%	66.0%
SSSG	1142 (±1.3)	2.3% (±0.5%)	8.7% (±0.4%)	25.5% (±0.9%)	63.5% (±0.9%)
School 4	1134	7.0%	8.0%	21.0%	65.0%
SSSG	1134 (±0.8)	2.8% (±0.6%)	10.3% (±0.4%)	27.3% (±1.0%)	59.5% (±0.8%)
School 5	1153	4.0%	8.0%	18.0%	70.0%
SSSG	1153 (±0.8)	1.5% (±0.4%)	6.3% (±0.6%)	23.5% (±1.0%)	68.8% (±1.0%)
School 6	1156	4.0%	8.0%	20.0%	68.0%
SSSG	1156 (±0.8)	1.7% (±0.6%)	6.4% (±0.4%)	22.6% (±0.9%)	69.4% (±0.7%)
School 7	1145	3.0%	9.0%	19.0%	68.0%
SSSG	1145 (±0.7)	2.2% (±0.4%)	7.4% (±0.5%)	24.7% (±0.9%)	65.5% (±0.7%)

If there are weaknesses in the way ICSEA values are calculated related to the way SES data are collected and/or the strength of the statistical relationships between SES and educational achievement in Years 3 and 5, the sample ACT government schools may be being disproportionately affected because of their 'abnormal' student populations. For example, the negative educational effects of having a relatively high proportion of students from low SES households may be 'swamping' the positive educational effects of having a relatively high proportion of students from high SES households in a manner that is not fully accounted for in the ICSEA calculations.[28] If this is the case, the ICSEA values for the sample government schools may need to be adjusted downwards to ensure the schools have more appropriate SSSGs.

While there are grounds for believing there may be deficiencies with the ICSEA values of the sample government schools, it is unlikely that these deficiencies account for the totality of the observed underperformance. Notably, weaknesses associated with the ICSEA values and SSSGs are unable to explain why, in 26% of instances over the study period, the sample government schools had a higher

[28] We note that the empirical evidence of school-level socio-economic effects is relatively weak. See G. Marks (2010), 'What aspects of schooling are important? School effects on tertiary entrance performance, School Effectiveness and School Improvement', *School Effectiveness and School Improvement* 21(3), 267–287.

proportion of students performing at or below the national minimum standard than the national average. Nor are they able to explain the significant differences in performance by subject area. Other factors appear to be contributing to the apparent underperformance of these schools, one of the more prospective of which relates to teaching methods.

4.2 Teaching methods

The international and domestic educational research and practitioner communities are divided over the best means to teach core literacy and numeracy skills. Arguably, the greatest divide is between those who prefer teaching practices that emphasise 'student-led' or 'discovery-based learning' and those who place greater emphasis on 'teacher-led' or 'direct instruction'.[29]

The difference between the two is relatively straightforward. Discovery-based learning is based on constructivist learning philosophy, which posits that students will learn best if they have greater responsibility for their own learning and are able to 'discover' for themselves the key facts, ideas or relationships that are fundamental to the mastery of a particular skill or subject. The core idea is that because students are intimately involved in shaping their own learning experience—for example, by posing the questions that they are interested in exploring—they will be more invested in their learning, and that, as a result, their understanding of a particular topic or subject matter will be superior to those students who have been explicitly told all the key facts, ideas and relationships and who will have developed the relevant skills in a logical, pre-ordained sequence.

In constructivist-based classrooms, the teacher's role is not to explicitly deliver a curriculum based on a logical sequencing of all the skills and knowledge needed to arrive at a particular end-point but rather to act as a guide or facilitator, gently nudging students towards those skills, knowledge and end-point.[30] That said, since constructivism is a philosophy of learning rather than a teaching approach per se, the actual application of discovery-based learning varies between classrooms and schools. All constructivist approaches are characterised by a focus on purpose, relevance and meaning but there are differences in the extent of explicit teaching employed and the amount of structure provided for skill development.[31] In other words, there are differences in the extent to which students have to 'discover' for themselves the key facts, ideas and relationships that are central to the mastery of a particular topic or subject matter.

By comparison, direct instruction is a teaching method that is 'teacher directed, has an academic focus, is goal orientated, and requires deliberate implementation'.[32] Consequently, teachers rather than students have the primary responsibility for ensuring that students learn and make adequate progress.

[29] K. Donnelly and K. Wiltshire (2014). *Review of the Australian Curriculum: Final Report.* Australian Government Department of Education, Canberra; F. McMullen and A. Madelaine (2014), 'Why is there so much resistance to Direct Instruction?', *Australian Journal of Learning Difficulties* 19(2), 137-151; L. Alfieri, P. Brooks and N. Aldrich (2011), 'Does Discovery-Based Instruction Enhance Learning?', *Journal of Educational Psychology* 103(1), 1-18; J. Reeves (2010), 'Teaching learning by script', *Language Teaching Research* 14(3), 241-258*;* K. Rowe (2006), *Effective teaching practices for students with and without learning difficulties: Constructivism as a legitimate theory of learning AND of teaching?,* Australian Council for Educational Research (ACER), Melbourne.
[30] See K. Alesandrini & L. Larson (2002), 'Teachers bridge to constructivism', *The Clearing House* 75(3), 118-121.
[31] Alfieri *et al*. (2011).
[32] McMullen and Madelaine (2014), p.138.

To ensure that this happens, all the skills and knowledge required to master a particular subject matter are deliberately and explicitly taught in a pre-ordained, logical sequence.

Direct instruction is also characterised by the use of demonstration, guided practice then independent practice; summarised in the phrase 'I do, we do, you do'.[33] Common features of direct instruction programs and techniques also include a fast pace, positive reinforcement and active student participation. Compared with other teaching methods, it is also perhaps the case that students spend more time working together in a group with the teacher before being asked to work independently.

It is important to note that direct instruction programs are not intended to be used exclusively and advocates of direct instruction do not suggest that entire school days be dedicated to direct instruction lessons.[34] This is because there is evidence to suggest that some skills or aspects of the curriculum are best taught using other teaching methods, including student-led approaches.[35] In contrast, many proponents of constructivism support the exclusive use of discovery-based learning, with the possible exception of low performing students.

Public discussion of the debate between proponents of these competing teaching methods has typically focused on reading instruction, and is sometimes referred to as 'the reading wars'.[36] Receiving less public attention is the fact that constructivist learning philosophy also influences spelling, grammar, writing and mathematics instruction.

Direct instruction programs were historically implemented as a means to improve educational outcomes for students from low SES backgrounds. However, since then, a substantial body of research has been produced indicating that direct instruction is a highly effective instructional method for diverse groups of students, including for average and high achieving students, those with intellectual disabilities and learning difficulties and students from non-English speaking backgrounds.[37] There is also strong evidence that direct instruction is effective in a wide range of subjects, not just literacy as is often believed, and that it is more effective than discovery-based learning.[38] According to McMullen and Madelaine:

> [i]n their meta-analysis of over 80 studies comparing discovery learning with other forms of instruction, Alfieri et al. … found discovery learning to be less effective than more explicit models of instruction …. Furthermore, studies that were found to be of higher quality showed

[33] McMullen and Madelaine (2014), p.138.
[34] McMullen and Madelaine (2014).
[35] L. Ellis (2005), *Balancing approaches: Revisiting the educational psychology research on teaching students with learning difficulties*, ACER, Melbourne. See also R Farkota's 'Maths Mastery model' which 'strikes a balance between teacher directed and student directed learning'. Available at: http://www.acer.edu.au/files/Direct_Instruction_Math_Mastery_Series.pdf (23 May 2017).
[36] P. Cormack (2011), 'Reading pedagogy, "Evidence" and education policy: learning from history?', *The Australian Educational Researcher* 38(2), 133-148.
[37] For an overview of the research to support direct instruction see McMullen and Madelaine (2014).
[38] NSW Government Education & Communities (2015), *What works best: Evidence-based practices to help improve NSW student performance,* Centre for Education Statistics and Evaluation, Sydney; and McMullen and Madelaine (2014).

> even larger benefits for explicit instruction over discovery, alluding to the dubious quality of research conducted to support discovery approaches.[39]

The exclusive use of constructivist approaches has been found to be particularly detrimental for students with learning difficulties. In the words of Ken Rowe, the former head of the Australian Council for Educational Research (ACER):

> … there is strong evidence that exclusive emphasis on *constructivist* approaches to teaching are neither initially nor subsequently in the best interests of any group of students, and especially those experiencing learning difficulties'.[40]

In the ACT, as is believed to be the case in other Australian jurisdictions, it is likely that constructivist-based approaches are the dominant instruction method used to teach core literacy and numeracy skills.[41] The qualifying language used here is a product of the fact that, despite the importance of the information, there is very little publicly available data on the teaching practices employed in Australian classrooms. Whether this reflects a lack of knowledge about teaching practices by state education authorities or an unwillingness to disclose this information is unknown.

The apparent preference for constructivist-based teaching methods is partly explained by the dominance of this approach within Australia's teacher training institutions, some of whose lecturers are hostile to direct instruction methods. Resistance to either direct instruction programs or direct instruction techniques is not, however, an Australian phenomenon.[42] An international literature review of attitudes to direct instruction found the following reasons were used to justify opposition to the use of direct instruction programs.[43]

- Direct instruction is suitable for low socio-economic or disabled students only.
- Direct instruction is just rote learning and only suitable for learning basic skills.
- Direct instruction is too teacher directed and encourages students to be passive.
- Direct instruction does not allow teachers to be creative.
- Direct instruction relegates teachers to 'technicians' rather than professionals.
- Students do not like direct instruction lessons.
- Direct instruction is not the best way to teach.

Direct instruction researchers contend that none of these are valid.[44]

The negative beliefs and attitudes towards direct instruction are likely to be shared by educational researchers and practitioners across all Australian jurisdictions. However, it is possible that there is greater resistance towards direct instruction in the ACT as a result of three factors.

- The ACT's high average NAPLAN results have masked underperformance in the Territory's government schools and thereby diminished interest in alternate teaching methods,

[39] McMullen and Madelaine (2014), p.147.
[40] Rowe (2006), p.1.
[41] Donnelly and Wiltshire (2014).
[42] Reeves (2010).
[43] McMullen and Madelaine (2014).
[44] McMullen and Madelaine (2014).

including direct instruction, as a way of improving education outcomes.

- The misperception that, because direct instruction is only for students from low SES backgrounds and those with learning difficulties, it is ill-suited to the ACT's schools, with its relatively high SES student population.
- The smaller, and possibly, more insular, nature of the ACT's education system has reduced the relative number of supporters of direct instruction amongst ACT education researchers, bureaucrats and practitioners.

Despite the barriers to the uptake of direct instruction in ACT government schools, there is anecdotal evidence to suggest that there is growing interest in direct instruction programs, particularly for those students experiencing reading difficulties. For example, over the past couple of years, a number of ACT government schools, including some of those in the sample, have started to use the direct instruction MultiLit (Making Up for Lost Time in Literacy) reading program developed at Macquarie University and have received direct or indirect funding from the Territory Government for this purpose. There is, however, no information available to indicate whether direct instruction programs or methods more generally are gaining ground in the ACT's government schools beyond reading instruction for low performing students. This pertains to both the instructional approach used to teach reading to all students (i.e. not only those experiencing reading difficulties) as well as the approach used to teach other subjects.

5. Conclusions and recommendations

The results of the analysis suggest there is a problem with the relative performance of high SES government primary schools in the ACT in NAPLAN tests. The reasons for this apparent underperformance are unclear. Arguably, amongst all the possible explanations, two of the more prospective are:

- the ICSEA scores used to derive the SSSGs do not adequately capture the true student- and school-level profiles of the schools; and
- there are deficiencies in teaching practices in the sample schools related to the uptake of direct instruction and other evidence-based teaching methods.

While these appear to be amongst the best explanations, there is currently insufficient information available to reach firm conclusions on the true causes of the apparent underperformance of the sample government schools.

Immediately prior to the release of this report, the ACT Auditor-General released a report on performance information on ACT government schools.[45] The report includes data on the relative NAPLAN performance of all ACT government schools for years 3, 5, 7 and 9 for the years 2015 and 2016. The data presented in the Auditor-General's report are consistent with the results of our analysis, suggesting the apparent underperformance of ACT government schools is system-wide and not confined to high SES schools.

On the basis of the above, we recommend the following.

[45] ACT Auditor-General (2017). *Performance Information in ACT Public Schools*. Government of the Australian Capital Territory, Canberra.

- An inquiry be undertaken to determine why ACT government schools appear to be underperforming in NAPLAN tests relative to their SSSGs.
- A voluntary program be established in underperforming schools to trial the use of best practice direct instruction teaching methods. Participating schools would be provided with teacher training in appropriate direct instruction methods and school performance would be monitored over the life of the program to assess the impact of the methods.
- ACARA amend the *My School* website to improve access to data on school and SSSG performance, particularly time-series data.