

TECHNICAL REPORT

My School: Student gain

Contents

Overview	1
Average and median	1
Schools with statistically similar students	2
Students with the same starting point	2
National comparison	2
<i>Notes</i>	3
Illustrations	
Figure 1. Shifts in average (mean) and median	3

© Australian Curriculum, Assessment and Reporting Authority (ACARA) 2014

This work is copyright. You may only download, display, print and reproduce this material in unaltered form only (retaining this notice) for your personal non-commercial educational use or non-commercial educational use within your organisation.

All other rights are reserved.

Requests and enquiries concerning reproduction and rights should be addressed to:

ACARA Copyright Administration

Level 10 255 Pitt Street

Sydney NSW 2000

info@acara.edu.au

Overview

The *My School* 'Student gain' page provides information on changes in a school's NAPLAN performance across a two-year period for reading, numeracy and writing. Gain is not calculated for grammar and punctuation or spelling. Only students who sat the test in both testing years at the same school are included in the information displayed for the selected school on the 'Student gain' page.

Students' NAPLAN performance in a school is summarised both as an average (mean) and as a median score. A school's median score is the middle score for all students in that school in a learning domain at a particular year level. In some situations, the median will be the better summary measure of a school's performance than the average.¹

The extent to which a school's NAPLAN results can change across a two-year period will depend on a number of factors. These include the expected rate of learning across that period (which is often greater for younger students) and instances where, for various reasons, students previously performed below their capacity but have now caught up in an apparent gain spurt.

Related to this, NAPLAN results can under-represent what a student can do. Exceptional students, for example, are likely to be able to do things that are not being measured in NAPLAN tests: their NAPLAN performance scores may be lower than what they would be if those other things were also included in the test. At present, NAPLAN tests are limited to cover only what can be tested with all students in a very short time period, and cannot fully capture the real learning achievements of exceptional students. Where a school has a relatively large proportion of exceptional students, its NAPLAN scores are likely to be high for both years of testing. The difference between those scores, however, may not accurately reflect the actual gain made by those students, because such a gain is only partly measured for them.

An essential element of the *My School* approach is the desire to help schools, parents and state administrators better understand how a school is performing given the distinctive constraints under which it operates. This is achieved by providing comparative information for a school in relation to schools with similar constraints.

Where a school is performing better than schools serving students from statistically similar backgrounds, then that school is demonstrating what can be achieved in similar circumstances. Where a school is performing less well than schools serving students from statistically similar backgrounds, then real potential may exist for improvement.

As students may change schools over time, a school's gain performance is described only for those students with NAPLAN results in the same school. The likelihood of changing schools is associated with a broad range of socio-demographic factors. Some schools are subject to far more change than others. The proportion of students in a school in any reporting year that can be used for these gain calculations can vary greatly by school.

Average and median

In most cases the average NAPLAN score and the median NAPLAN score will either be the same or very similar. There will be differences where, for example, some students have performed very well, or very poorly, relative to the other students, beyond what would normally be expected. Where that is the case, the distinctive performance of those few students will influence the calculation of the average, which then is less capable of summarising the performance of a school overall. In that case, the median will provide a better indication of a school's overall performance.

For small schools, in particular, it may only take the performance of a single student to affect the 'average' performance of all students in a school. Provision of the median helps address that particular problem.

The margins of error with the median estimates are based on indicative errors for the medians. More information is available by following 'More information' button on each NAPLAN page.

Schools with statistically similar students

As in the previous versions of *My School*, the 'Student gain' page provides a comparison of a school's performance at each testing year level in Reading and Numeracy, with the performance that would be expected from schools with the same or highly similar context of community socio- educational advantage.

For this purpose, the Index of Community Socio-Educational Advantage (ICSEA) is used by regressing a summary measure of NAPLAN performance on ICSEA for all schools to determine an expected NAPLAN score associated with any school's particular ICSEA value. The regression process is described in the ICSEA 2013 technical report, available on the 'More information' page of the *My School* website.

This expected NAPLAN score is described in the graph as the NAPLAN value for schools serving students from statistically similar backgrounds. The indicative error associated with that expected NAPLAN score is calculated as if the number of students associated with such a hypothetical set of schools is at least 200 students.

In the 2010 and 2011 versions of *My School*, two graphs were shown: one for the school, and one for the expected value ('Schools with similar students'). Since 2012, those two representations have been consolidated into a single graph to enable a closer, more direct visual comparison. Further, there is now a choice between viewing the average or the median performance figures.

Students with the same starting point

For some schools, their ICSEA value does not always adequately reflect the abilities of their students. For example, a school may have a relatively large proportion of special intake students, and comparisons with students from statistically similar backgrounds do not provide a full picture of their performance. Alternatively a school may be a selective school and, once again, comparisons with schools serving statistically similar students are unhelpful.

In such circumstances, the comparison of students with the same starting scores is likely to provide a more valid picture of the performance of students in a given school.

Only students with test results in both years are included in the calculation of those national estimates, regardless of school, while the selected school's figure still applies only to those students who sat both tests in that particular school.

Essentially, each student matched within a school is compared nationally with all other students who had exactly the same test result two years previously. The depiction shows how the matched students in the selected school are faring relative to all students who sat both tests (regardless of school) and who had the same starting point two years previously. This allows the following questions to be analysed:

- Are those students doing as expected given those prior results?
- Are they doing better than what could be expected for those students, or are they doing less well than those other students?

Technically, this is achieved by calculating for each student in a school the average/median of the results nationally in the second testing occasion for all students who had that exact same score in the prior test.

The final estimate for the school is then the average/median of those national results associated with each of its students. As the national estimates are based on very large numbers of students, the margin of error associated with them is very small. As a consequence, and to minimise potential visual clutter in the graph, no error is reported on it.

National comparison

A third point of comparison is through the use of national estimates: with the depiction of averages, the national average result is used; with the depiction of medians, the national median result is used. These national figures may differ from other national estimates on the *My School* website by being constrained to only students for whom there are NAPLAN results for both years (regardless of school) used in the comparisons. Once again, because of the very large numbers of students used to generate the national figures, margins of error are very small and thus not displayed.

1. Average and median

The average is the sum of data points divided by the number of data points, while the median is the middle data point, or the 50th percentile. They are both measures of central tendency, often used to summarise a distribution with a single figure.

Under normal circumstances, the average score will be the same as the median score: where both describe the central point of the distribution of student NAPLAN results. Where student results in a school have a more varied distribution, such as with some students more likely to perform better or less well than the other students than would otherwise be expected, then the average score may not be the best summarising measure of a school's performance.

To illustrate, the figure below plots the results of 17 students. The first 15 students are normally distributed. Considering them alone, both the average (mean) and the median are the same: 350. If we then add two students, both of whom have exceptional results, then the summary measures shift.

The median shifts only slightly, to 349, while the average (mean) shifts to 344. Therefore the question becomes 'Which of these figures better describes the performance of the school overall?' In this way it is demonstrated that using the median is preferable.

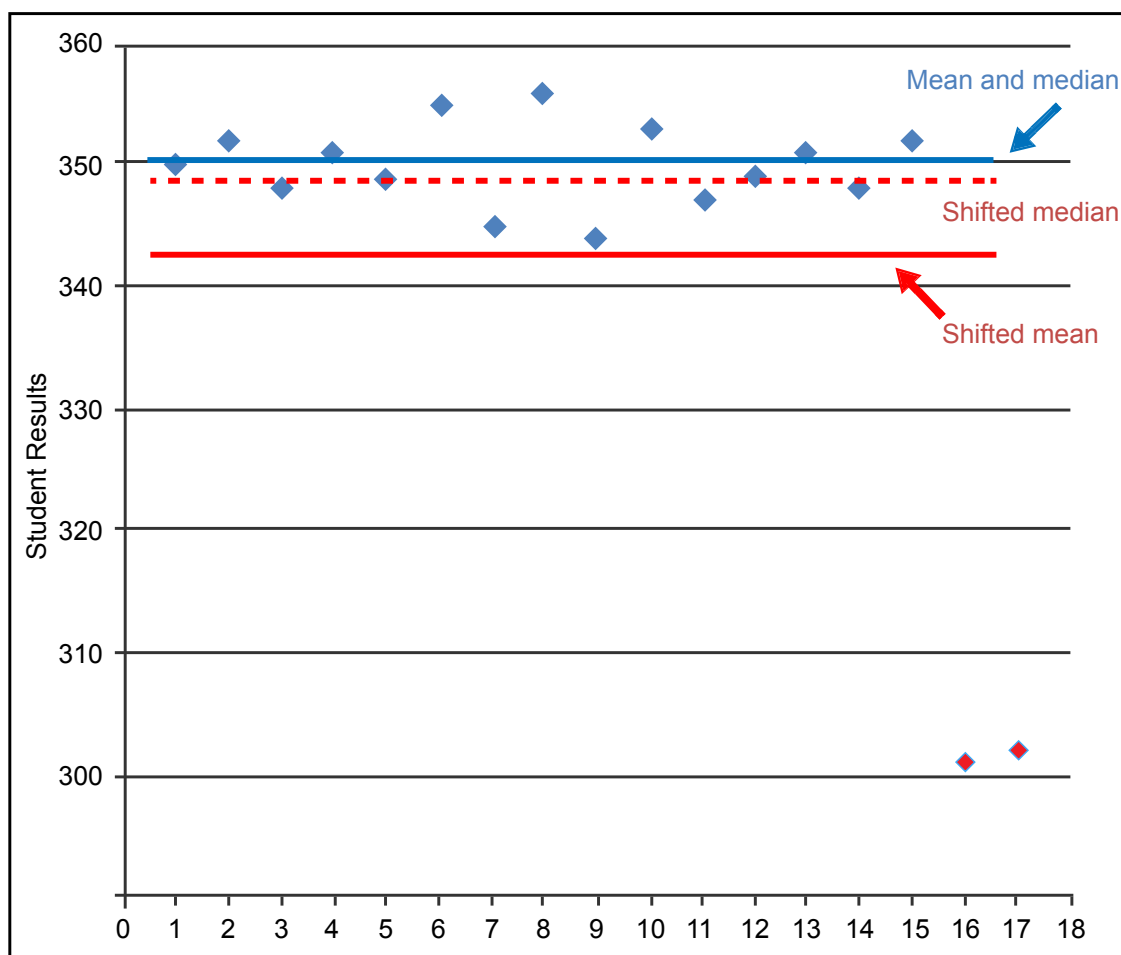


Figure 1. Shifts in average (mean) and median with introduction of a few exceptional results