

Guide to understanding 2013¹ Index of Community Socio-educational Advantage (ICSEA) values

Contents

Part One

Measuring Socio-educational Advantage

What is the <i>Index of Community Socio-educational Advantage</i> ?	1
Why was ICSEA developed?	1
How was ICSEA developed and how is it reported?	1
Do all schools have an ICSEA value?	2
How is ICSEA used on the <i>My School</i> website?	2
How can ICSEA and <i>My School</i> be used to drive school improvement?	7

Part Two

Calculating ICSEA Values

What is the ICSEA formula?	7
What information is used to develop the formula?	8
What are the variables used to develop the direct data methodology?	8
Where does the data used to calculate ICSEA values come from?	8
Does data collected at enrolment become out-of-date?	9

Part Three

The review of ICSEA

Need for enhancement of ICSEA calculation process	9
Enhancement of ICSEA and SEA quarters construction	9
2013 ICSEA calculation formula	10

¹ 2013 ICSEA values are published on the 2014 release of the *My School* website

Part One

Measuring Socio-educational Advantage

[What is the *Index of Community Socio-educational Advantage*?](#)

There is a substantial body of research evidence that shows the educational performance of students, among many other things, is related to certain characteristics of their family and school such as parental education and occupation and school characteristics such as location and socio-economic background of the students it serves.

The *Index of Community Socio-educational Advantage* (ICSEA) is a scale of socio-educational advantage that is computed for each school.

ICSEA enables visitors to the *My School* website to make comparisons between schools based on the level of educational advantage or disadvantage that students bring to their academic studies.

ICSEA does not use information concerning the wealth of the parents of students or the resources of a school. An ICSEA value is not a rating of the school, of its staff or teaching programs, nor its overall student performance in testing programs.

[Why was ICSEA developed?](#)

ICSEA was developed to enable fair and meaningful comparisons between schools on the basis of the performance of their students in literacy and numeracy as estimated by the National Assessment Program-Literacy and Numeracy (NAPLAN).

ICSEA allows for comparisons to be made between schools that are matched according to their socio-educational advantage (SEA) and thereby allowing fair comparisons of NAPLAN results between schools with students who have a similar level of SEA.

[How was ICSEA developed and how is it reported?](#)

The development of ICSEA involved collecting student family background data and identifying, through the use of statistical models, the combination of variables that have the strongest association with student performance in the NAPLAN tests.

ICSEA values are calculated on a scale which has a median of 1000 and a standard deviation of 100.

ICSEA values typically range from approximately 500 (representing extremely educationally disadvantaged backgrounds) to about 1300 (representing schools with students with very educationally advantaged backgrounds). ACARA calculates an ICSEA value for all schools for which sufficient aggregate-level data is available.

Figure 1 below depicts the distribution of ICSEA values across all those schools in Australia for whom a value is calculated.

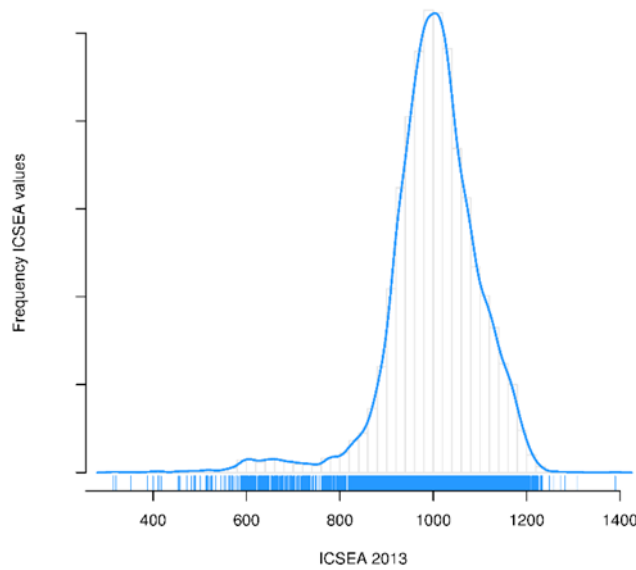


Figure 1. Distribution 2013 ICSEA values

Do all schools have an ICSEA value?

Schools that are categorised as special schools on the *My School* website do not have ICSEA values reported and are not included in Statistically Similar Schools Groups. ICSEA is not published if the number of students' records available for the ICSEA calculation is equal or less than five. Special schools are schools for students with disability. Similarly, ICSEA values are not generated for juvenile justice schools. An ICSEA value for these schools can be provided or published on the website at the school's request, provided that data sufficiency requirements are met.

How is ICSEA used on the *My School* website?

There are six instances where ICSEA values are displayed or used to depict information on *My School*. They are:

1. The *School profile* page

Each school's ICSEA value appears on the *School profile* page, displayed in the Student background section. In addition to the school ICSEA value a table presents the distribution of students across four socio-educational advantage quarters representing a scale of relative disadvantage ('bottom quarter') through to relative advantage ('top quarter'). SEA quarters provide further contextual information about the socio-educational composition of the students in the school.

Student background 2013				
Index of Community Socio-Educational Advantage (ICSEA)				
School ICSEA value	1068			
Average ICSEA value	1000			
Data source	Parent information			
Distribution of students ²				
	Bottom quarter	Middle quarters	Top quarter	
School Distribution	15%	21%	30%	34%
Australian Distribution	25%	25%	25%	25%
<i>Percentages are rounded and may not add to 100</i>				

Figure 2. Student background data on the *School profile* page

2. The *Similar schools* page

A school's ICSEA value enables it to be placed within a group of up to 60 schools that serve students who are identified as having similar levels of socio-educational advantage. This group is referred to as a Statistically Similar Schools Group (SSSG). While these schools may be found in varied geographic locations throughout Australia, based on ICSEA their students can be determined as having similar levels of educational advantage.

The description "statistically similar schools" does not imply that the students in each school are a close match with each other across each of the individual variables measured, but that taken together, the set of variables associated with each school in the group suggests that similar performance on NAPLAN tests could be expected across the schools - noting the predictive relationship between each of the variables and aggregate NAPLAN performance. Figure 3 below provides a graphical depiction of two schools and their SSSG.

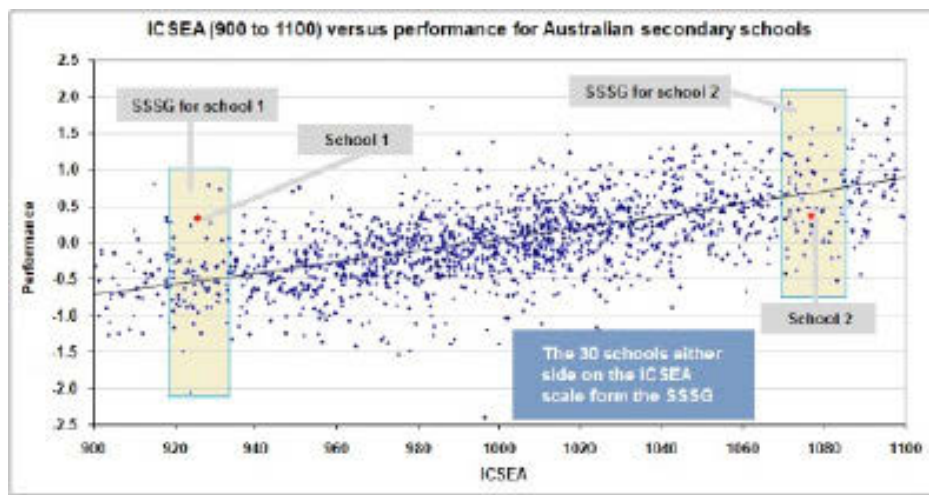


Figure 3. Creating a statistically similar schools group

The chart on the *Similar schools* page provides an opportunity to graphically compare the results of a similar schools group and to identify high performing schools, and schools that are not performing as well as others. Figure 4 below shows an example of the chart.

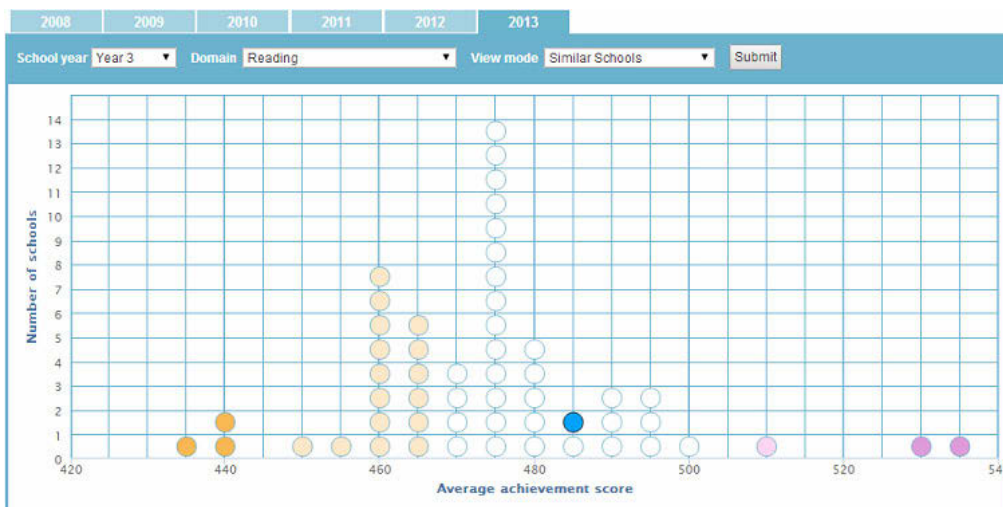


Figure 4. Depicting statistically similar schools group (SSSG) NAPLAN results

3. The NAPLAN results in graphs page

In the NAPLAN results section of *My School*, the *Results in graphs* page depicts the selected school's results with an average result for schools serving students from statistically similar backgrounds and all schools. The grouping of similar schools is based on the schools' ICSEA values.



Figure 5. Example of selected school's NAPLAN results graph

4. The NAPLAN Results in numbers page

The *Results in numbers* page displays in table form the selected school's average results in each of the five test domains, and across each of the school's year levels in which students sit the tests. For each result comparison average results are provided for the Statistically Similar Schools Group (determined using ICSEA) and for all Australian schools. Figure 6 provides an example of the table.

Within each major cell the school's average results are shown, with the margin of error associated with each result immediately below. The margin of error figures represent the lower and upper bounds of a 90% confidence interval around the average. Below each of these cells are two smaller cells, marked "SIM" and "ALL", showing the average and confidence intervals for statistically similar schools, and the average for all Australian schools respectively.

	2008	2009	2010	2011	2012	2013							
							Colour Scheme: Red & Green <input type="button" value="Submit"/>					Alternate view: Results in graphs	
	Reading		Persuasive Writing		Spelling		Grammar and Punctuation		Numeracy				
Year 3	484 463 - 504		491 474 - 508		469 450 - 487		515 493 - 536		468 451 - 485				
	SIM 478 469 - 487	ALL 419	SIM 451 443 - 459	ALL 416	SIM 450 442 - 459	ALL 411	SIM 483 473 - 493	ALL 428	SIM 445 436 - 453	ALL 397			
	563 547 - 578		530 515 - 545		534 519 - 548		566 550 - 583		577 563 - 590				
Year 5	548 540 - 557		502 506 - 522		478 521 - 537		494 540 - 559		501 528 - 544		486		
	592 584 - 599		541 556 - 573		517 580 - 595		549 584 - 601		535 592 - 608		542		
	628 624 - 639		623 608 - 627		554 614 - 630		583 631 - 648		573 650 - 665		584		
Year 7	592 584 - 599		541 556 - 573		517 580 - 595		549 584 - 601		535 592 - 608		542		
	628 624 - 639		623 608 - 627		554 614 - 630		583 631 - 648		573 650 - 665		584		
	628 620 - 637		623 612 - 634		629 619 - 638		639 630 - 649		693 684 - 701				
Year 9	628 624 - 639		623 608 - 627		554 614 - 630		583 631 - 648		573 650 - 665		584		
	628 624 - 639		623 608 - 627		554 614 - 630		583 631 - 648		573 650 - 665		584		
	628 624 - 639		623 608 - 627		554 614 - 630		583 631 - 648		573 650 - 665		584		

Figure 6. Example of the NAPLAN Results in numbers table

5. The NAPLAN Results in bands page

On the *Results in bands* page a table displays the selected school's results for each of the five test domains at each year level for which data are available, across the NAPLAN achievement bands. The table shows the percentage of the school's students who achieved results within each band level, together with the average percentages of students in the Statistically Similar Schools Group and the average percentages of students in Australian schools achieving results in each band. An example is provided at Figure 7 below. More information about achievement bands is provided on the National Assessment Program website at www.nap.edu.au

2008		2009		2010		2011		2012		2013	
Domain Reading <input type="button" value="Submit"/>											
Year 3			Year 5			Year 7			Year 9		
Band	Achievement		Band	Achievement		Band	Achievement		Band	Achievement	
									8		12%
											14%
											5%
						8		27%	8		37%
						or		26%	8		34%
						above		8%			15%
			8		42%	8		32%	8		28%
			or		30%	8		31%			30%
			below		11%			10%			20%
			7		23%	7		23%	7		17%
					31%			25%			17%
					22%			30%			29%
6		52%	6		24%	6		12%	6		4%
or		48%	6		25%	6		14%	6		4%
below		23%			30%			26%			16%
6		20%	6		0%	6		5%	5		1%
		21%	6		11%	6		3%	or		0%
		23%			24%			13%	below		5%
4		16%	4		3%	4		1%			
		36%			2%	4		0%			
		23%			10%	or		4%			
3		7%	3		0%	3		0%			
		8%	or		0%						
		10%	below		2%						
2		2%									
		3%									
		9%									
1		0%									
		0%									
		3%									
Selected school			Selected school			Selected school			Selected school		
Assessed:	100%		Assessed:	97%		Assessed:	99%		Assessed:	96%	
Exempt from test:	0%		Exempt from test:	2%		Exempt from test:	0%		Exempt from test:	1%	
Participated in test:	100%		Participated in test:	99%		Participated in test:	99%		Participated in test:	99%	
Absent from test:	0%		Absent from test:	2%		Absent from test:	1%		Absent from test:	1%	
Withdrawn from test:	0%		Withdrawn from test:	0%		Withdrawn from test:	0%		Withdrawn from test:	0%	
Australian schools			Australian schools			Australian schools			Australian schools		
Participated in test:	95%		Participated in test:	98%		Participated in test:	96%		Participated in test:	92%	
Exempt from test:	2%		Exempt from test:	2%		Exempt from test:	2%		Exempt from test:	2%	
Absent from test:	3%		Absent from test:	2%		Absent from test:	3%		Absent from test:	6%	
Withdrawn from test:	2%		Withdrawn from test:	2%		Withdrawn from test:	1%		Withdrawn from test:	2%	

Figure 7. Example of the NAPLAN Results in bands table

6. The *Student gain* page

Student gains in NAPLAN performance are reported for Reading, Writing and Numeracy. In situations where the necessary data are not available, or school circumstances do not allow the matching of students across year levels, it is not possible to display *Student gain*.

NAPLAN results displayed for the selected school relate only to matched students; that is, those students who sat NAPLAN tests on two occasions at the same school and have results on both occasions. Results are shown only for schools with five or more matched students.

On this page users can compare the level of gain for the selected school with: the average level of gain for students in schools from the Statistically Similar School Group; with the average level of gain for all students with the same starting scores; and with the average level of gain for students in all Australian schools. An example is provided at Figure 8 below.

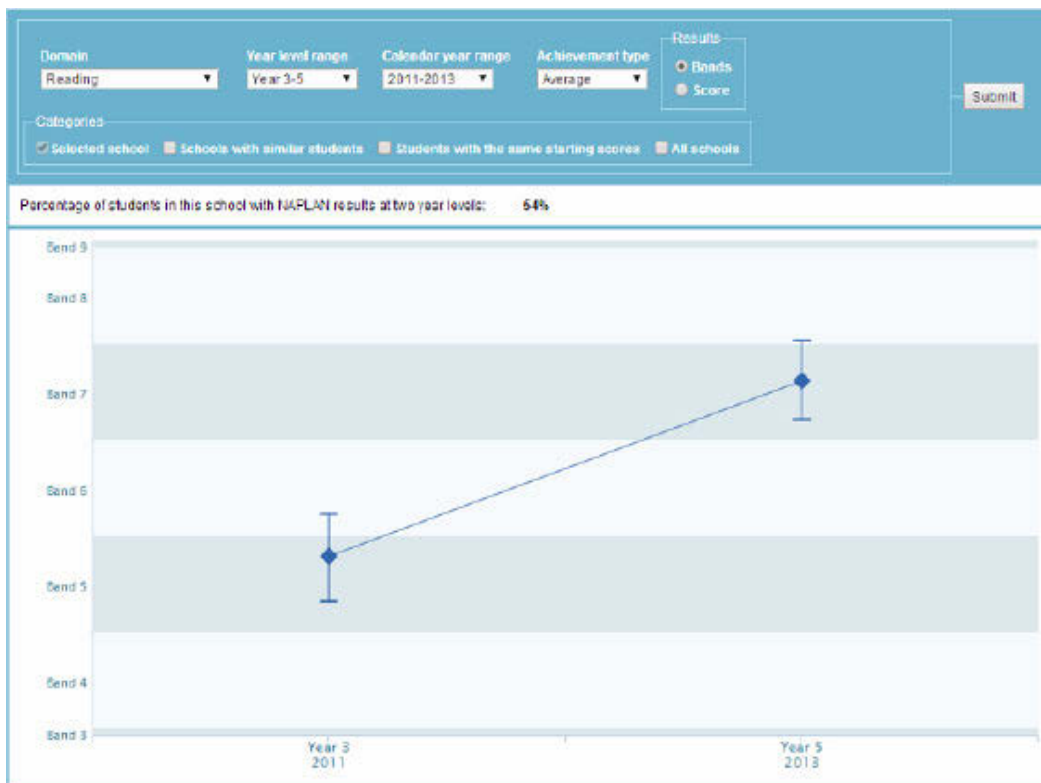


Figure 8. Example of the *Student gain* graph

How can ICSEA and *My School* be used to drive school improvement?

Schools can use the information on *My School* as a basis on which to:

- monitor performance and identify priority areas in which to focus improvement efforts;
- identify schools with students from statistically similar backgrounds that are performing at a high level, particularly in their priority areas;
- explore success factors in statistically similar high-performing schools across the country and incorporate relevant strategies into their improvement plans; and
- communicate with the wider school community about their performance and gain support for improvement initiatives.

Teachers can use the information on *My School* as a basis on which to:

- integrate the information from the website with system and classroom data and use this to develop intervention programs to support higher levels of student achievement in literacy and numeracy;
- determine where they need to make adjustments to teaching programs and strategies;
- connect with teachers in other schools to share ideas;
- compare the progress of their students with students in other schools; and
- engage with parents in support of their children's learning.

Parents and other members of the school community can use the information on *My School* as a basis on which to:

- understand how their local school is performing relative to other schools serving students from statistically similar backgrounds;
- gain a broader understanding of the learning environments and performance of schools in their local community, as well as within their state or territory and across the nation;
- initiate communication with a school based on comprehensive and detailed information;
- seek a greater level of engagement with a school in support of their child's learning; and
- become involved in advocating for and supporting improvement initiatives within the school.

Part Two

Calculating ICSEA Values

What is the ICSEA formula?

ICSEA values were first published on the *My School* website at the end of January 2010. For the second iteration of the website the ICSEA formula was revised and student-level data, in addition to community-level data, were used to create a stronger measure of educational advantage.

At the request of Education Ministers, ACARA investigated the possibility of using student-level data, obtained directly from students' families, to calculate ICSEA, rather than indirect (ABS) census data.

The modelling undertaken indicated that by using direct student-level parent occupation and parent education data, it is possible to obtain a stronger measure of student socio-educational advantage (SEA). In broad terms, that model is based on the following formula:

$$\text{ICSEA} = \text{SEA} + \text{Remoteness} + \text{Percent Indigenous student enrolment}$$

What information is used to develop the formula?

In the past the construction of the SEA component of ICSEA for *My School* used one of two available data sources:

1. Direct data: information relating to parent occupation, school education and non-school education obtained from student enrolment records. These data are 'direct data' and referred to as 'parent data' on *My School*.
2. Indirect data: information sourced from the ABS Population and Housing Census data. These are 'indirect data' and are referred to as 'Census' data on *My School*.

What are the variables used to develop the direct data methodology?

When enrolling a child in school all parents are asked which of the following options best describes their occupation, and the school education and non-school education levels they achieved.

Parent occupation

- Senior management in large business organisation, government administration and defence and qualified professionals
- Other business managers, arts/media/sportspersons and associate professionals
- Tradesmen/women, clerks and skilled office, sales and service staff
- Machine operators, hospitality staff, assistants, labourers and related workers
- Not in paid work in last 12 months

School education level

- Year 12 or equivalent
- Year 11 or equivalent
- Year 10 or equivalent
- Year 9 or equivalent or below

Non-school education level

- Bachelor degree or above
- Advanced diploma/Diploma
- Certificate I to IV (including trade certificate)
- No non-school qualification

Where do the data used to calculate ICSEA values come from?

Most state and territory government Education Departments and Catholic system jurisdictional authorities have provided ACARA with the parental background data for all students in their schools.

For some non-government systemic schools and most independent schools, direct data were only available for students who participated in NAPLAN. Those data were collected and provided to ACARA by the Test Administration Authority in each state and territory.

Do data collected at enrolment become out-of-date?

Even though parental background data is collected at enrolment and may not be updated during the time that a student is enrolled in a school, it remains reasonably accurate.

The school education level of parents will only change for the very few parents that undertake further secondary-level schooling through TAFE or an equivalent. The non-school education level will only change for the comparatively small proportion of parents who undertake formal post-school education.

Although many parents are likely to change jobs during the time that their children are enrolled in a school, they are likely to remain within the same occupation category.

Part Three

The review of ICSEA

Need for enhancement of ICSEA calculation process

The ICSEA calculation procedure is subject to ongoing review and enhancement as access to data is improved and the methodology refined. Improvements during 2013 have enabled us to reduce some of the unexplained variations between years and to improve the consistency of the ICSEA and the within-school distribution of students across the SEA quarters.

Enhancement of ICSEA and SEA quarters construction

During 2013, ACARA conducted a review of the process for calculating ICSEA. As a result, the process for the calculation has been improved, which will in turn improve the statistical reliability of ICSEA and reduce year-to-year variability. The enhanced process has been used to calculate the ICSEA values published on the 2014 release of *My School*.

In order to increase reliability of ICSEA, the new process improves the calculation of the SEA component, and streamlines and enhances the ICSEA regression model. The enhanced process applies a measurement model to estimate a single indicator for a student's SEA rather than treating responses to six parental background questions as separate indicators of educational advantage.

An additional benefit of this approach is that the measurement model is able to generate estimates of student socio-educational advantage even when some parental data might be missing, thereby mitigating the impact of missing data on the year-to-year stability of ICSEA.

ACARA has also consolidated the treatment of responses "not in paid occupation in last 12 months" for the parental occupation questions by creating a separate variable for this response (one for each parent) and explicitly including these variables in the measurement model alongside the responses to six original parental background questions.

The enhanced ICSEA calculation process also explicitly accounts for the effect of any clustering of student educational advantage in a school in addition to school geographical location and percentage of Indigenous students. This is achieved through the use of a multi-level modelling approach that appropriately combines the respective influences of student and school-level factors to calculate ICSEA.

Finally, the enhanced method for the estimation of students' SEA provided student-level estimates that are directly used in the calculation of ICSEA and SEA quarters, thereby considerably improving the alignment between the two.

2013 ICSEA calculation formula?

While the 2013 ICSEA calculation formula is similar to that used in the past, it now employs a multilevel regression model which reflects the combined influence of the student and school's cohort SEA components on NAPLAN performance. In broad terms, that model is based on the following formula:

$$\text{ICSEA (student)} = \text{SEA (student)} + \text{student Indigenous status} + \text{SEA (school cohort)} + \text{Percent Indigenous student enrolment} + \text{Remoteness}$$

This approach produces an ICSEA for each student, and then the ICSEA for a school is calculated as the mean of all individual student-level ICSEA values.

As a result of the enhancement of the ICSEA calculation process, the 2013 ICSEA and SEA quarters for schools have been calculated using only the direct parental background data, thus meeting the request of Education Ministers and original purpose of ICSEA.

What processes have been undertaken to quality assure the approach taken to calculate 2013 ICSEA values?

ACARA has implemented parallel analyses in which all the data preparation, modeling and calculations were completed by the different officers, independently of each other, and using different analytical software and independently prepared data sets. The outcomes of these parallel processes were compared at crucial junctures, and their match provided assurance that the final calculation accurately reflects available data.

ICSEA values for all schools are previewed by state and territory government Education Departments, Catholic Education Commissions, and independent schools and their associations. ACARA works closely with jurisdictional authorities to review ICSEA calculations where data are not adequate, or where, owing to extraordinary circumstances, the data do not properly reflect the background of students at an individual school.

ACARA has conducted substantial and comprehensive research during the conception, evaluation and implementation of the enhanced 2013 ICSEA calculation process. During this process ACARA has commissioned advice from leading educational measurement experts and has consulted with its ICSEA Advisory Group, which consists of leading statistical experts and educational leaders.

ACARA has also conducted extensive consultation with representatives of government, Catholic and independent school sectors throughout all stages of development and implementation of the 2013 ICSEA calculation process.