

**Guide to understanding 2012 *Index of Community  
Socio-educational Advantage (ICSEA) values***

March 2013

© Australian Curriculum, Assessment and Reporting Authority 2013

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

All images are indicative only and may be subject to change. Graphical depictions should not be relied upon for accuracy of content.

All other rights are reserved. Requests and inquiries concerning reproduction and rights should be addressed to:

ACARA Copyright Administration, ACARA  
Level 10, 255 Pitt Street  
Sydney NSW 2000

## 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
How is ICSEA used on the <i>My School</i> website?	2
Do all schools have an ICSEA value?	8
How can ICSEA and <i>My School</i> be used to drive school improvement?	8

### Part Two

#### Calculating ICSEA Values

What is the ICSEA formula?	9
What information is used to develop the formula?	9
What are the variables used to develop the direct data methodology?	10
How are the school variables weighted?	11
Where does the data used to calculate ICSEA values come from?	12
Does data collected at enrolment become out-of-date?	12
What are the variables used to develop the indirect data methodology?	12
Can schools have confidence that the direct and indirect data are comparable?	13

### Part Three

#### The review of ICSEA values for 2012

Does the approach to calculating 2012 ICSEA values differ from that taken for 2011 values?	14
What processes have been undertaken to quality assure the approach taken to calculate 2012 ICSEA values?	16

## List of illustrations

Figure 1. Distribution curve of all schools' ICSEA values	2
Figure 2. Student background data on the School profile page	2
Figure 3. Creating a statistically similar schools group	3
Figure 4. Depicting statistically similar schools group (SSSG) NAPLAN results	4
Figure 5. Example of selected school's NAPLAN results graph	4
Figure 6. Example of the NAPLAN <i>results in numbers</i> table	5
Figure 7. Example of the NAPLAN <i>results in bands</i> table	6
Figure 8. Example of the <i>Student gain</i> graph	7
Table 1. 'Direct' data variables and weightings	11
Table 2. School variables and weightings	11
Table 3. 'Indirect' data variables and weightings	13

## Part One

### Measuring Socio-educational Advantage

#### What is the *Index of Community Socio-educational Advantage*?

Research shows that there is a strong relationship between the educational achievement of a student and his or her educational advantage as measured by his or her parents' occupation and their level of education.

The *Index of Community Socio-educational Advantage* (ICSEA) is a scale that represents levels of educational advantage. A value on the scale that is assigned to a school is an averaged level for all students in that school.

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

ICSEA does not describe nor reflect the wealth of parents of students in a particular school or the wealth or resources of the 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 of the performance of students in a given school in literacy and numeracy (based on performance in National Assessment Program—Literacy and Numeracy (NAPLAN) testing) with the performance of similar schools who have students with statistically similar backgrounds, as represented on the *My School* website.

#### 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, and how much each of these variables individually contribute to performance in NAPLAN.

ICSEA values are calculated on a scale which has a median of 1000 and a standard deviation of 100. ICSEA values range from around 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. ICSEA values are usually not generated for specialist schools as many of their students typically do not participate in NAPLAN testing.

Figure 1 below depicts the distribution of ICSEA values across the national cohort of Australian schools.

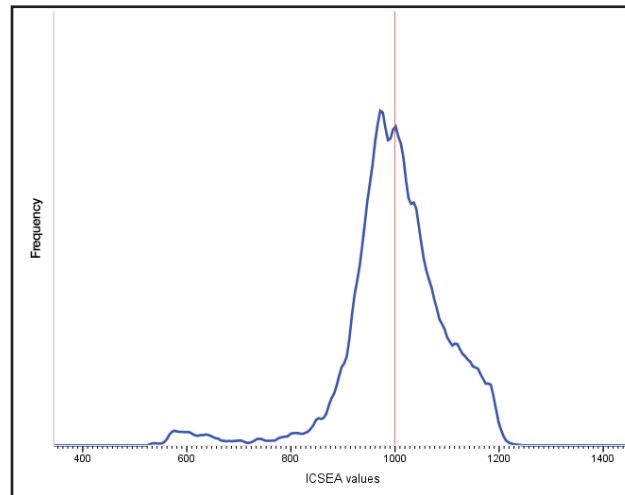


Figure 1. Distribution curve of all schools' ICSEA values

## 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 in a school across four quarters that represent a scale of relative disadvantage (shown in the "bottom quarter") through to relative advantage ("top quarter"). The two middle quarters are combined on the table ("middle quarters").

Student background 2011				
<a href="#">Index of Community Socio-Educational Advantage (ICSEA)</a>				
School ICSEA value	931			
Average ICSEA value	1000			
Data source	Parent information			
Distribution of students	Bottom quarter	Middle quarters		Top quarter
School distribution	52%	15%	24%	9%
Australian distribution	25%	25%	25%	25%
<i>Percentages are rounded and may not add up 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 statistically similar backgrounds. This group is referred to as the 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 group.

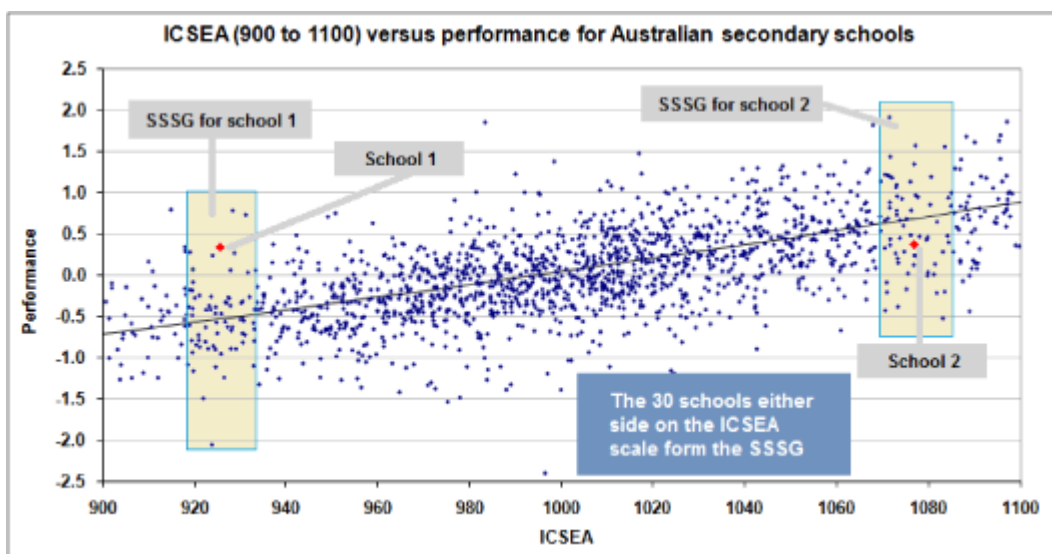


Figure 3. Creating a statistically similar schools group

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, or to see where a school may seek to improve. Figure 4 below shows an example of the chart.

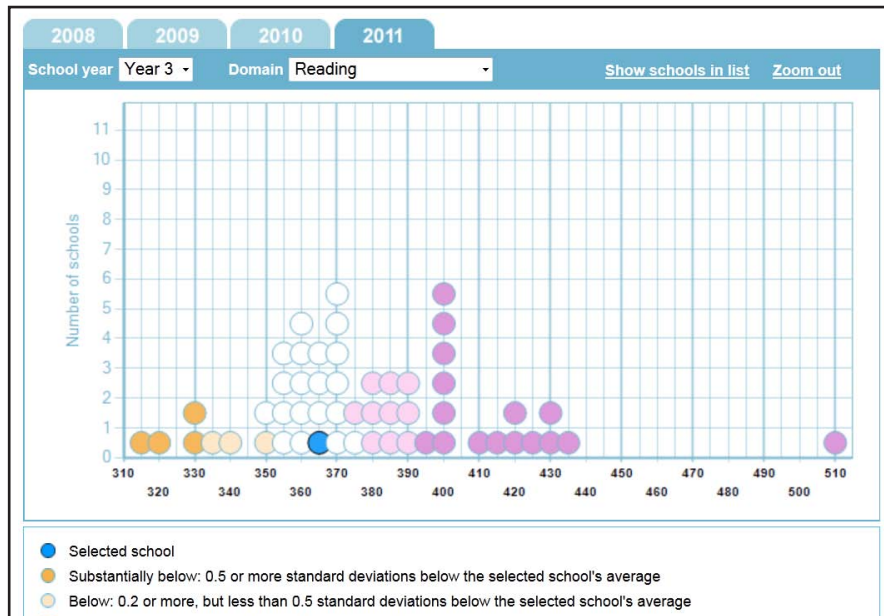


Figure 4. Depicting statistically similar schools group (SSSG) NAPLAN results

### 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 together with an average result for schools serving students from statistically similar backgrounds. 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 who 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. An example of the table is shown at Figure 6 below.

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 margin of error figures for statistically similar schools, and the average for all Australian schools respectively.

2008		2009		2010		2011				
Change Colour ▾		Show results in graphs								
	Reading		Persuasive Writing		Spelling		Grammar & Punctuation		Numeracy	
Year 3	466 451 - 481		438 425 - 451		461 447 - 475		468 452 - 484		436 423 - 449	
	SIM 479 470 - 488	ALL 416	SIM 451 443 - 459	ALL 416	SIM 450 441 - 459	ALL 406	SIM 479 469 - 489	ALL 421	SIM 447 439 - 455	ALL 398
Year 5	535 519 - 551		533 518 - 548		531 516 - 546		546 529 - 563		555 541 - 569	
	SIM 550 541 - 559	ALL 488	SIM 524 516 - 532	ALL 483	SIM 523 515 - 531	ALL 484	SIM 557 548 - 566	ALL 499	SIM 541 533 - 549	ALL 488
<b>SIM</b> Schools serving students from statistically similar backgrounds <b>ALL</b> Australian schools' average <input type="checkbox"/> Student population below reporting threshold <input type="checkbox"/> Year level not tested						Selected school's average is <input checked="" type="checkbox"/> substantially above <input checked="" type="checkbox"/> above <input type="checkbox"/> close to <input type="checkbox"/> below <input checked="" type="checkbox"/> substantially below these schools' average				

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 (determined using ICSEA) 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](http://www.nap.edu.au).

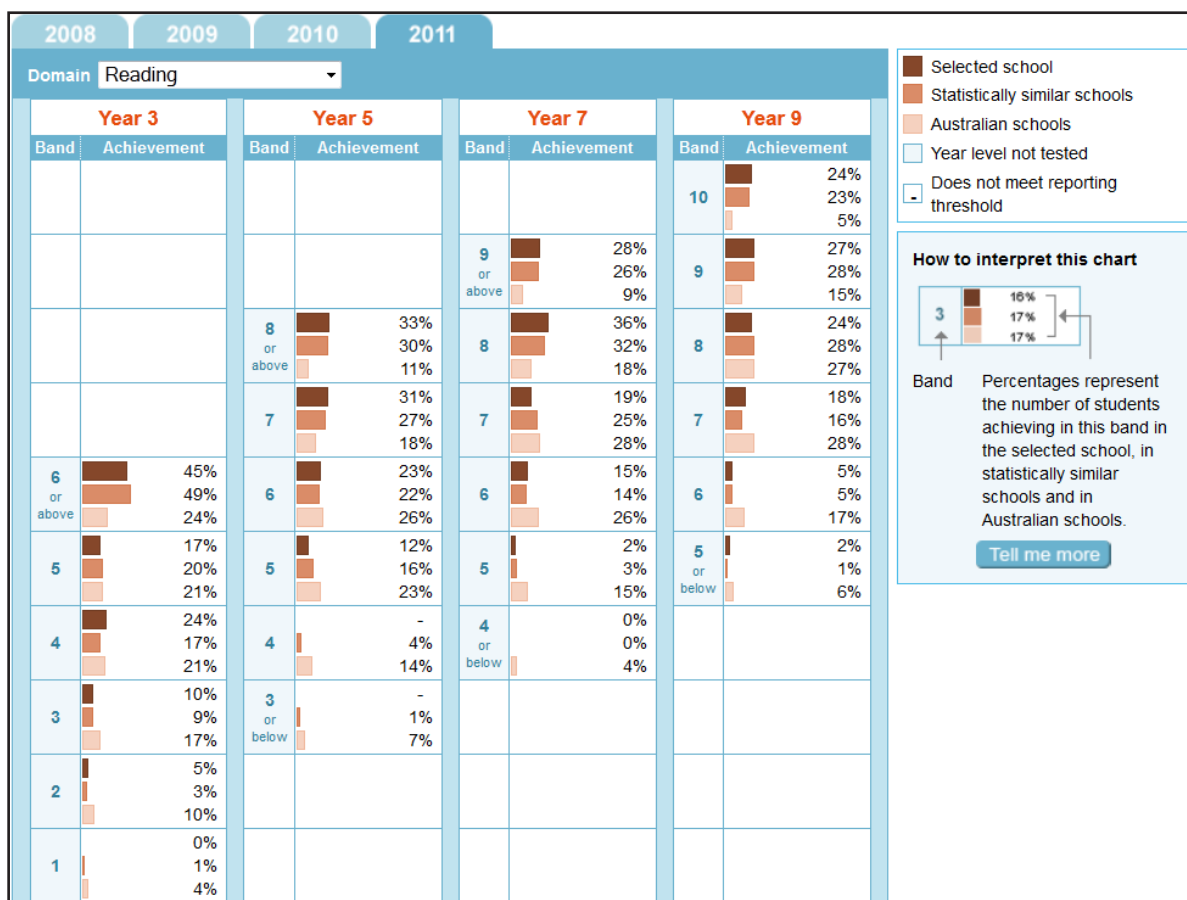


Figure 7. Example of the NAPLAN results in bands table

## 6. The *Student gain* page

Student gains on their NAPLAN performance are reported for Reading, Writing and Numeracy test domains. In situations where the necessary data is 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 at two year levels. 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 schools from the Statistically Similar School Group; with the average level of gain among all students with the same starting scores; and with all Australian schools. An example is provided at Figure 8 below.



Figure 8. Example of the *Student gain* graph

## Do all schools have an ICSEA value?

Schools that are categorised as specialist schools on the *My School* website do not have ICSEA values reported and are not included in Statistically Similar Schools Groups. Specialist schools are schools for students with disability and juvenile justice schools. An ICSEA value for these schools can still be provided or published on the website at the school's request, provided that data sufficiency requirements are met.

## 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 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 education data, it is possible to obtain a stronger measure of socio-educational advantage (SEA) in most cases.

Since that time ACARA has continued to explore further options to refine and strengthen the model. In broad terms, that model is based on the following formula:

$$ICSEA = SEA \text{ (direct/indirect)} + Remoteness + Percent \text{ Indigenous student enrolment}$$

#### What information is used to develop the formula?

The construction of the SEA component of ICSEA for *My School* uses 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 and through NAPLAN reporting. These data are 'direct data' and referred to as 'parent data' on *My School*.
2. Indirect data: information sourced from the Australian Bureau of Statistics (ABS) 2011 Population and Housing Census data. These are 'indirect data' and are referred to as 'Census' data on *My School*.

If the SEA value calculated using direct data is found to be within the acceptable confidence interval, the direct data is used in the formula. If the estimate is found to be less accurate, the indirect data is used. In the case of small schools, or schools with significant missing data, the indirect data measure of SEA may give a better estimate than the direct measure.

The indirect method involves matching data for Statistical Area Level 1 (SA1) collected by the Australian Bureau of Statistics and residential addresses from a school's enrolment records. ABS introduced SA1 as the smallest, publicly available, data collection unit in the 2011 Population and Housing Census.

For the indirect method the following steps are taken to calculate an ICSEA value for each school:

1. Addresses for each student at the school are gathered (without student names);
2. Each address is matched to its ABS SA1 area; and
3. The relevant SEA characteristics of the SA1 in which each student at the school lives (known from ABS census data) are aggregated to the school level.

## 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

All categories were considered in developing ICSEA. Of these categories, however, the following group of variables, in combination, were found to be the best predictors of achievement in NAPLAN. Therefore, they are the variables used in the calculation of the SEA component of ICSEA.

Table 1 below lists these variables, and the weight given to each variable in calculating ICSEA.

Variables	Weighting applied in ICSEA calculation
Occupation variables	
• Associate professional	0.016
• Skilled non-professional	-0.003
School education variables	
• Year 10 or equivalent	-0.006
• Year 9 or equivalent or below	-0.005
Non-school education variables	
• Bachelor degree or above	0.019
• Advanced diploma/Diploma	0.015
• No non-school qualification	-0.011

Table 1. 'Direct' data variables and weightings

## How are the school variables weighted?

The school variables shown in Table 2 below are then added to this SEA component to produce the final ICSEA value. The SEA component has a weight of 0.670.

Variables	Weighting applied in ICSEA calculation
• Percentage of Aboriginal student enrolments	-0.025
• Accessibility/Remoteness index	0.002

Table 2. School variables and weightings

## Where does the data used to calculate ICSEA values come from?

Parental background data are collected at enrolment. Most state and territory government Education Departments and Catholic system jurisdictional authorities have provided ACARA with the data for all students in their schools collected in this way.

For some non-government systemic schools and most independent schools, direct data were only available for students who participated in NAPLAN in 2009, 2010, 2011 and 2012, which were collected and provided to ACARA by the Test Administration Authority in each state and territory.

## Does data collected at enrolment become out-of-date?

Even though parental background data is collected at enrolment and is unlikely to 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 relatively 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.

## What are the variables used to develop the indirect data methodology?

The indirect methodology is very similar to the 2009 calculation. A slightly amended formula has been used in the *My School* calculations since 2010. A number of redundant variables have been removed to create a simpler calculation. The variable of Indigeneity has been removed from the calculation of the SEA value, but remains within the ICSEA calculation with an increased weight.

Table 3 below shows the SA1 variables (indirect data) used for the SEA component and their corresponding weightings in the formula.

Variables	Weighting applied in ICSEA calculation
<b>Non-school education variables</b>	
• Percentage of people aged 25 years and over with a diploma qualification	9.54
• Percentage of people aged 25 years and over with a certificate I or II qualification	-27.77
• Percentage of people 25 years and over with no non-school educational attainment	-2.68
<b>School education variables</b>	
• Percentage of people 25 years and over who did not attend school beyond year 8 or below	-5.51
<b>Occupation variables</b>	
• Percentage of employed people with an occupation as a Technician or Trade Worker	-7.83
• Percentage of employed people with an occupation as a Community and Personal Services Worker	-12.77
• Percentage of employed people with an occupation as a Sales Worker	11.81
• Percentage of employed with an occupation as a Labourer	-4.50
<b>Others</b>	
• Percentage of families that are one parent families with dependent offspring only	-3.13
• Percentage of unemployed adults	-3.24

Table 3. 'Indirect' SA1 data variables and weightings

## Can schools have confidence that the direct and indirect data are comparable?

To ensure the direct SEA measure and the indirect SEA measure are comparable they are placed on a common scale. These are then combined with the school variables in the ICSEA formula to calculate the ICSEA value for each school. Accuracy of the source data is ultimately the responsibility of parents who complete both ABS census forms and student enrolment information for their children.



## Part Three

### The review of ICSEA values for 2012

#### Does the approach to calculating 2012 ICSEA values differ from that taken for 2011 values?

ACARA has, as an ongoing priority, reviewed the way in which ICSEA is calculated and has made minor refinements where this has been shown to increase the accuracy and/or reliability of the values generated. Each year new data have also been collected to serve as inputs for the modeling. Notwithstanding this, the broad approach taken has remained constant over time.

To generate ICSEA values for the 2013 update of *My School* ACARA built on the earlier modeling work conducted for prior versions of the site. The general approach taken for 2012 is very similar to that taken previously.

#### Direct and indirect data

While there was still a need to rely on indirect data to a certain degree for the 2012 values, the source for that indirect data was an updated source—specifically, SA1 aggregated data from the 2011 Census of Population and Housing. Previously, indirect data was sourced from Census Collection District (CCD) data from the 2006 Census. Accordingly, the variables and coefficients used for indirect data in the 2012 ICSEA values necessarily differ from earlier indirect ICSEA values drawing on 2006 census data.

In modelling values for 2012, ACARA continues to give preference to direct data sources, drawing only on indirect data where insufficient student-level direct data were available.

#### Aggregated school-level variables

In addition to student-level data, previous modeling has also included aggregated school-level direct data. These have included the following variables:

- School percentage of Aboriginal and Torres Strait Islander (ATSI) student enrolments
- School Accessibility/Remoteness Index of Australia (ARIA) values
- Squared and cubed transformations of available parent data (reflecting the non-linear relationship between educational outcomes and educational advantage).

These three school-level variables have been retained in the 2012 values.

Following advice from ACARA's ICSEA Expert Panel, and after consultation with government and non-government school sector stakeholders, it was decided to discontinue the use of the adjustment factor for what has been termed Disadvantage Language Background Other Than English (LBOTE).

This adjustment has been used for 2010 and 2011 ICSEA, however, further analysis showed that this adjustment was not adding to the ICSEA values in the planned manner. In particular it was observed that this factor varies significantly from year to year, which is reflection of the level of missing responses in available data for both language status and parental educational attainment. In addition, the analyses showed that the this factor correlates considerably with variables already included in the model.

## Smoothing of ICSEA values

Variability across years of data available for ICSEA generation may be due to a number of factors, including actual changes in cohort characteristics, measurement error, random error and missing data. To minimise the impact of those non-trend factors on ICSEA variability, in 2011 ACARA introduced some element of weighted averaging between 2010 and 2011 values.

For 2012, while the weighted averaging approach has been discontinued, ACARA has implemented a more straightforward approach to smoothing values across time, by simply averaging values calculated under the 2012 model and previously published 2011 values. In particular where variability in the past has been due to random error (or natural variability), this effect will be moderated by the averaging approach. This is consistent with the time series smoothing approaches adopted in many fields of quantitative analysis.

## Business rules for 2012 ICSEA values

The overarching business rules for calculating the 2012 ICSEA values are:

1. Where sufficient direct parental data from enrolments exist, ICSEA is calculated by regressing NAPLAN performance on direct parent education and occupation variables, and on school-level ATSI and ARIA variables.
2. Where sufficient direct parental data from enrolments do not exist, ICSEA is calculated by regressing NAPLAN performance on indirect data, where students' residential addresses inform proxy variables for parent education and occupation, drawing on such data available from the 2011 Census.
3. The ICSEA value generated in step 1 or 2 above (as appropriate) is added to the ICSEA value calculated previously for 2011, and the result is divided by two.

## What processes have been undertaken to quality assure the approach taken to calculate 2012 ICSEA values?

ACARA has implemented paralleled analysis in which all the data preparation, modeling and calculations were completed by the independent officers using different analytical software and independently prepared data sets. The outcome of these parallel processing were compared at the crucial junctures and their match provided assurance that the final calculation accurately reflect 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 is not adequate or extraordinary circumstances mean the data does not properly reflect the background of students at an individual school.



[www.myschool.edu.au](http://www.myschool.edu.au)

**For more information call the helpline staff at  
ACARA on 1300 895 563 and follow the prompts.  
Alternatively send an email to [info@acara.edu.au](mailto:info@acara.edu.au).**