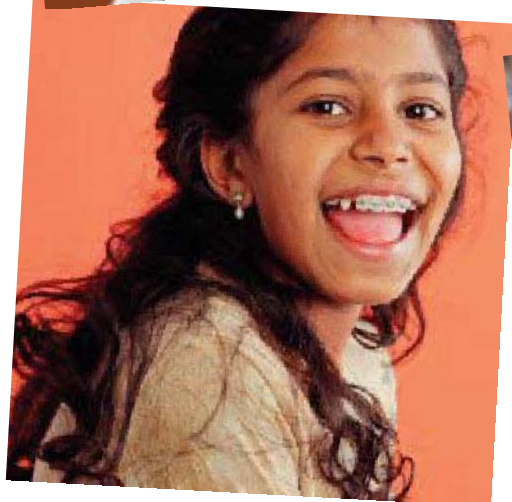


Measuring performance fairly

Developing intake adjusted
performance measures in
Victorian government schools

2011 Revision



**Published by the
Communications Division
for Data, Outcomes and Evaluation Division
Department of Education and
Early Childhood Development**
Melbourne
March 2011

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Introduction to the 2011 Revision

In 2009, the introduction of intake adjusted school performance measures accompanied a new approach to transparency and accountability in Victorian government schools.

Since that time, additional work has been undertaken to strengthen the methodological approach used to calculate these measures, increasing their applicability to the broadest range of school settings and building on the range of intake measures used to account for variations in schools level measures of performance.

This revision of the document aims to document only those changes that have been introduced in 2011. For clarity, all such changes have been labelled with the words “2011 update” and marked in bold font.

1. Using data to improve

Victorian schools have been at the forefront of educational data use for many years. On a daily basis, data from a range of sources feeds into the decisions we make about our work – teachers use data to individualise learning and to monitor how effective they are in supporting every student to progress; school leadership teams use data to evaluate the success of their improvement strategies; and school councils use data to ensure their overall plans for the school are meeting the needs of their local community.

Victorian schools have also seen many innovations in data over the last decade, from the early days of “like” school groups through to the implementation of the Victorian Essential Learning Standards, NAPLAN and percentile comparison charts. And we have pioneered the use of attitudinal data from students, teachers and parents to develop a thorough understanding of our strengths and weaknesses.

We are now ready to take the next step.

Taking a comprehensive view of performance

When it comes to data, what we measure must be determined by what we value.

In Victoria, we are clear about the outcomes we are striving to achieve for our children and young people. From birth through to adulthood, we are not interested in simply getting students to attain higher test scores – we are aiming for much more than that. So we want our data to recognise the comprehensive range of outcomes we’re aiming to achieve.

In Victorian government schools, the Accountability and Improvement Framework clearly articulates three outcome areas for students:

- student learning,
- student engagement and wellbeing, and
- student transitions and pathways.

To help us improve outcomes in all three areas, we need a sensitive and sophisticated way to understand our performance. To get this understanding it is important that we take into account the context of each school, the challenges it faces, and consequently the value it is adding in improving student outcomes.

Studies in Victoria and around the world tell us that a student’s background makes a difference to his or her outcomes. This doesn’t mean we should expect less of students from more disadvantaged backgrounds. Nor does it mean that the capacity of these students to achieve is necessarily less than others. But it does mean that if we are to judge each school’s performance fairly – if we are to compare schools - then we first need to take account of students’ differing starting points.

Two kinds of value added measurement

One way to do this is to track the progress of every student in every school over time and construct measures of how cohorts of students in each school progress, taking into account the rate at which students with similar characteristics progress in other schools. This type of measurement is referred to as “value added”.

Value added measurement in Victoria will become possible in the near future, once we have a unique identifier for every student and once we are able to use NAPLAN data to track cohorts over a three year period as they progress through their schooling from Year 3 to Year 5, from 5 to 7 and from 7 through to 9.

In the meantime, there is another type of value added measurement we can use – *contextual* value added. Recently, we have been working, with support from Professor Stephen Lamb from the University of Melbourne, to develop contextualised value added measures using data from Victorian government schools. Many of these developments draw on the work of Professor David Jesson from the University of York, UK.

Rather than looking at the growth in learning outcomes for individual students, contextual value added measures look at the differences in school performances across a range of outcomes after adjusting for differences in student background characteristics between the schools, including the student learning outcomes of each school’s students. We adjust for the social composition of the school and we adjust for the academic composition.

Importantly, contextualised value added measures allow us to do two things.

First, they allow us to look at outcomes beyond the student learning domains, so that we can understand how we’re performing against measures of student engagement and wellbeing and measures of students’ transitions and pathways. They allow us to measure all of what we value.

And secondly, they focus the measurement on the whole school performance, rather than on that of individual students or teachers. These measures cannot, for instance, be used to attribute performance to a particular cohort of students as they are never based on only one cohort; they use contextual data and broad measures of student outcomes across the entire school.

Intake adjusted performance measurement

We know that a multitude of factors influence school performance outcomes; from parent and community values, to teachers’ content

knowledge and instructional expertise, and through to the capacity of the school's leadership team. Some of these factors we can measure. Many we either cannot or do not. A key strength of contextual value added measures is that they take account of the factors we can measure and tell us how much variation between schools is explained by them. By inference, the unexplained component – the value added – can then be attributed to what we're not accounting for. A part of this is the performance of the school.

In Victoria, we plan to use the term *intake adjusted performance* to describe these measures, rather than 'contextual value added'. Doing so will reserve the term *value added* for the time when we can develop student level growth measures.

In one sense, intake adjusted performance measures are easy to explain: they measure the performance of each school after taking account of the factors we know make the biggest difference to the variations in outcomes between schools.

To take a concrete example, we know that where students live can make a big difference to where they go after leaving secondary school. For instance there are often fewer further education and employment options in rural areas compared to metropolitan areas. So we take the rurality of the school into account when measuring the success of their post-school destination outcomes – we “adjust” for rurality.

But once we get past this basic notion – that we adjust for the factors we know make the biggest difference – things start to get more complex. This is because different factors affect different outcomes in different ways.

Taking another example, we know that the school completion rate of indigenous students is around half that of non-indigenous students. So we need to take account of the indigenous composition of each school's cohort in considering their post-compulsory outcomes. Add this to the adjustments made for rurality and other factors and things quickly get very complex.

Typical school intake characteristics that we measure and can take account of include:

- a measure of the school's academic composition
- the school's Student Family Occupation (SFO) Density
- the proportion of students funded under the Program for Students with Disabilities (PSD)
- the proportion of Indigenous students
- the proportion of refugee students
- the proportion of students with English as a Second Language (ESL)
- the school's rurality, and
- the school size.

The technical appendix at the back of this document gives a complete description of how the intake adjusted performance measures are calculated, including the intake characteristics that make a difference to each of our outcomes measures, and which measures of schools' academic composition are used for each outcome.

Presenting intake adjusted performance

With intake adjusted performance measures, what we're ultimately interested in is the extent to which each school is performing higher than, lower than, or broadly similar to the level of performance we might estimate given the intake characteristics of their student population.

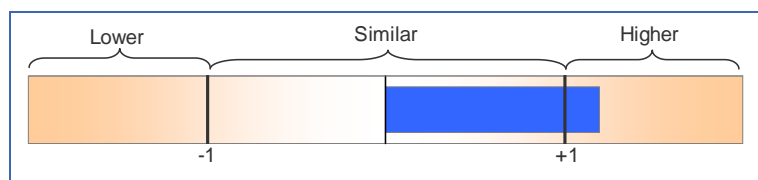
Based on what we know about the effect each intake measure has on each outcome, we can plot the estimated performance of a school and then measure the gap between that estimated performance and the actual performance. We call this gap the standardised residual, as it is measured in units of standard deviation.

For our purposes, a standardised residual between -1 and +1 means that the school is performing within a similar range to other schools given their intake characteristics. A standardised residual lower than -1 means the school is performing at a lower level, while a value of more than +1 means the school is performing at a higher level.

The standardised residuals tell us whether the school, taking into account the students it has, is performing higher than, lower than, or broadly similar to other schools, taking into account the students they have.

We can plot these residual scores on a chart. Figure 1.1 gives an example for a school's performance on the Year 5 NAPLAN Reading test, where the blue bar represents the school's standardised residual and the horizontal scale is in units of standard deviation.

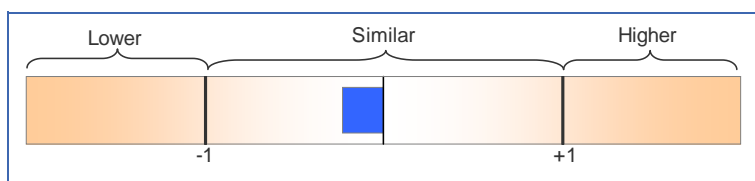
Figure 1.1: Year 5 NAPLAN Reading: a school with intake adjusted performance at the higher level



The critical factor in Figure 1.1 is not how far the blue bar extends to the right – away from the middle of the chart - but whether or not it crosses the +1 line. In this case it does, showing that the school's outcome is more than a full standard deviation higher than what we might estimate after adjusting for the appropriate intake characteristics.

Figure 1.2 shows another example. Even though this school's standardised residual is slightly negative – to the left of the middle of the chart – the important thing is that it is still between -1 and +1, meaning that the school's intake adjusted performance is within a similar range after adjusting for its intake.

Figure 1.2: Year 7-10 Real Retention Rate: a school with intake adjusted performance at a similar level



The Details

The technical appendix to this document gives a detailed account of the principles and processes used to construct the intake adjusted performance measures, including which intake characteristics are adjusted for in the calculation of each outcome.

Using intake adjusted performance data

In Victorian government schools, we have long-established ways of working with different types of data – for instance, we favour consistent patterns in the data over point-in-time figures; we use absolute measures to monitor trends over time and relative measures to determine areas for improvement. We reserve judgement in our interpretations. We do not apportion blame for the past but instead focus on the desired future, seeking to answer the questions ‘what would it take to improve these results?’ and ‘how will we know if it’s working?’

And just as we would never use a single piece of assessment data to give a definitive understanding of a student’s learning, we would not use intake adjusted performance as a definitive measure of our school. These data provide us with another perspective – they can highlight areas where we’re doing well, and areas where we may need to focus additional attention and support. But they should always be interpreted alongside the other data we have in our schools.

Importantly, intake adjusted performance measures tell us how we’re going after adjusting for our intake, but they do not tell us about our students’ absolute outcomes and they do not replace or supersede those measures. The different types of data we have available are complementary, and it is the cumulative weight of the evidence we have about our performance that allows us to set out our improvement plans with confidence.

As always, in using these data we need to bear in mind that data alone never provides a complete picture of a school's performance – for that, we must always add our own contextual and professional knowledge to our interpretations. Intake adjusted performance data, as with all data, are only a starting point for the professional discussions about how we can further improve outcomes for students. These discussions must be moderated by the contextual factors that influence our work – the expectations of our local communities, the organisational structures that we work within, our shared goals and our professional practice itself – the factors that are not captured by the data.

Working towards value added performance measures

By late 2010, the first cohorts of Australian students will have undertaken two successive NAPLAN tests. These students will have progressed from Years 3, 5 and 7 in 2008, through to Years 5, 7 and 9 in 2010. It will be the first chance Australia will have to investigate the growth of students at a “whole-of-population” level.

It will also be an opportune time to investigate how value added measurement can best work in an Australian context. As part of a four-year plan to deliver the goals of the Melbourne Declaration on Educational Goals for Young Australians, governments around the country have agreed that they will, “where appropriate, develop value-added measures for schools' performance and analysing student results over time.”¹

These new value added measures will provide us with another useful perspective on the success of our teaching and learning. It is important though, that we don't lose sight of the other outcomes we value; those relating to students' engagement and wellbeing, and to students' transitions and pathways. The intake adjusted school performance measures will continue to provide us with a fair measure of our performance in these areas.

Ongoing development

The introduction of intake adjusted measures of school performance in Victoria is the first phase of an ongoing process of development. As we learn more about how these measures can be used to support schools in their improvement efforts, we will work to enhance the underlying

¹ MCEETYA four-year plan 2009 – 2012: A companion document for the Melbourne Declaration on Educational Goals for Young Australians, MCEETYA 2009 ([http://www.mceetya.edu.au/verve/_resources/MCEETYA_Four_Year_Plan_\(2009-2012\).pdf](http://www.mceetya.edu.au/verve/_resources/MCEETYA_Four_Year_Plan_(2009-2012).pdf))

statistics: using a wider range of intake measures where this makes sense and including new data sets as they emerge.

2. Technical Appendix

Working parameters

This model of intake adjusted school performance measurement was constructed under a set of working parameters that influenced some of the methodological decisions.

Importantly, the intake adjusted measures were developed using real-world data and as a result, are subject to all the characteristics of real-world data including data entry errors, missing cases and even contextual circumstances in some schools that mean they simply don't fit "the model".

In a similar vein, it is worth remembering that the data used to construct the model were not originally designed for this purpose. This doesn't mean that they can't be used in a meaningful way to construct intake adjusted measures, but we do need to be mindful of any resulting limitations.

Design principles

Following are the principles under which the intake adjusted school performance measures were developed. Included under each principle is a short description or example of some of the implications the principle has for the overall model.

- (1) The measures must be applicable to all Victorian government Primary, Secondary and Primary/Secondary schools wherever possible.

For this first iteration of these measures, only Primary, Secondary and Primary/Secondary school types have been included in the modelling. We will continue work to include other school types, such as Special schools, over time.

2011 Update: Community Schools and select entry schools have been excluded from the model as the intake measures used do not adequately account for their performance.

- (2) Only existing, readily available data sets can be used.

Another way to put this principle is to say that new data could not be developed specifically for the purposes of constructing these measures – it is the principle of "collect once, use many times." In the interests of minimising school workload and using the available data for a multitude of purposes, what was available was used. The key implication for the methodology is that many of the data available to Victorian government schools are already aggregated; they are not reported at the student, or class, or teacher level and so the methodology could not take account of the multilevel nature of the data.

- (3) The methodology must be replicable across a defined set of outcome variables relating to Student Learning, Engagement and Wellbeing, and Transitions and Pathways.

Finally, the methodology needed to be applied across the range of outcomes that are valued and measured in Victorian government

schools. It was of little value, for instance, to develop a procedure to calculate intake adjusted performance measures for VCE that couldn't then be applied to attendance data.

An outline of the model

The model is constructed using a series of multiple ordinary least squares linear regressions.

Regression analysis is a statistical technique that gives us an understanding of how one variable (the dependent variable) tends to change when a number of other independent variables are varied.

For simplicity, we can refer to the dependent variable as the outcome we're interested in (such as teacher judgements against the VELs), and the independent variables as the contextual intake measures we have for our schools, such as SFO, or school size.

One outcome of regression analysis is an equation that can be used to plot a regression line – a line on a chart that shows us how the outcomes tend to change along with the intake measures. The equation for this line can be used to estimate a school's outcome on a dependent variable given the various intake characteristics the school has. So we can plug in a school's values on each of the intake characteristics and calculate an estimate of the school's outcome value.

We can then measure the gap between a school's actual outcome and their estimated value from the regression equation. We call this gap the "residual" – it is a residual in that it measures the remainder, or the distance, between the estimated value and the actual value. The residual can be either positive (where the school is performing at a level higher than estimated) or negative (where the school is performing at a lower level).

Tables 2.1 and 2.2 give the complete details for how each of the outcomes measures and each of the intakes variables are constructed.

For each of the outcome measures, two regressions are run, one based on the latest year of data (LY) and one based on a four-year aggregate (4Y). This is done to account for the volatility in the data for smaller schools. Where four years of data are not available for a measure, as much data as possible is used, with the intention of building up to four years over time. For instance, since NAPLAN data is only available for 2008 and 2009, the 4Y measure has been replaced by a two-year measure for this first version of the model.

2011 Update: With the availability of 2010 NAPLAN data, a three-year aggregate has now be calculated and used.

As the outcome measures become available during the year at different times, the LY measures will never be based on the same calendar year. For example, the School Connectedness measure from the *Attitudes to School Survey* for 2009 is available in October 2009 but at that point in the school year, 2009 VCE results are not.

The four-year average is an average of each of the last four years, rather than an aggregation of four years worth of data – this eliminates the chance of a single large cohort skewing the result and ensures the focus of the measure is on the school’s performance over a four-year period.

The standardised residuals for each equation tell us whether the school, taking into account the students it has, is performing higher than, lower than, or broadly similar to other schools, taking into account the students they have.

The model - intake measures

A range of data is used to describe the background characteristics of student populations. To get the most meaningful and useful information from the intake adjusted school performance measures, we need to adjust for the characteristics of the school that make the biggest difference to the outcomes we’re interested in.

Table 2.1 describes all of the intake measures in detail.

It is important to highlight that for each regression equation, all of the intake measures, except one, describe the context of the school in terms of its socio-economic situation, student profile, geographic situation and school structure. The exception is the intake measure that describes the **academic composition of the school**. Table 2.3 shows which academic composition measure is used for each outcome.

Table 2.1: Intake measures

	Intake Measure (abbrev.)	Definition
All schools	SFO (SFO_LY and SFO_4Y)	The school’s Student Family Occupation (SFO) index. For multi-campus schools, the school-level SFO density is calculated by taking an average of the multiple SFO scores weighted by campus enrolments.
	% Indigenous (pclndigP6LY, pclndigP64Y, pclndig712LY, pclndig7124Y)	The percentage of indigenous enrolments based on the August census enrolments for the whole school. This is constructed as a categorical variable to account for its non-normal distribution. 2011 Update: the percentage of

	Intake Measure (abbrev.)	Definition
		indigenous students is now transformed as a natural log.
	% Integration (pcPSDLY and pcPSD4Y)	<p>The percentage of students in receipt of funding under the Program for Students with Disabilities (PSD), based on the February census enrolments for the whole school.</p> <p>This is constructed as a categorical variable to account for its non-normal distribution.</p> <p>2011 Update: the percentage of integration students is now transformed as a natural log.</p>
	Remoteness (ARIA)	<p>The rurality index of the school, based on the ABS ARIA codes, where:</p> <p>1 = capital city (Melbourne) 2 = inner regional 3 = outer regional, and 4 = remote</p> <p>This is a categorical variable.</p> <p>2011 Update: this is no longer constructed as a categorical variable.</p>
	Total Enrolments (enrolmentsP6_LY, enrolmentsP6_4Y, enrolments712_LY, enrolments712_4Y)	<p>Total FTE school enrolments based on the February census.</p> <p>This is constructed as a categorical variable to account for its non-normal distribution.</p> <p>2011 Update: this is no longer constructed as a categorical variable.</p>
Mobility (MBsecLY, MBsec4Y) (used for real retention only)	<p>Based on the August census, the proportion of students who are SRP funded and who enrolled between (not inclusive) the previous August census day and 1 December in the previous calendar year; and between (not inclusive) the February census day and the August census day (plus one day) in the current year.</p> <p>This is constructed as a categorical variable to account for its non-normal distribution.</p> <p>2011 Update: Mobility is no longer used as an intake</p>	

	Intake Measure (abbrev.)	Definition
		measure. This has been replaced by 'stability' (a measure constructed from NAPLAN data).
	Stability (pcStabilitySecLY and pcStabilitySec4Y) (used for real retention only)	<p>The stability of a school's student population is calculated using Year 7 and Year 9 matched cohort NAPLAN data. The stability measure takes account of student movement both into and out of the school between Years 7 and 9.</p> <p>The 4Y measure currently consists of just LY data. When sufficient data are available, the 4Y measure will consist of 2-Year, then 3-Year, then 4-Year data.</p>
	% Female Students (pcGirlsP6LY, pcGirlsP64Y, pcGirls712LY, pcGirls7124Y)	The percentage of female enrolments based on the February census.
	Proportion ESL (pcESLLY and pcESL4Y)	<p>The proportion of ESL enrolments based on the August census. A student is defined as ESL if they come from a language background other than English, speak a language other than English at home as their main language, and have been enrolled in an Australian school for less than five years.</p> <p>This is constructed as a categorical variable to account for its non-normal distribution.</p> <p>2011 Update: this is no longer constructed as a categorical variable.</p>
	Proportion Refugees (pcRefugeesLY and pcRefugees4Y)	<p>The proportion of refugee enrolments based on the August census.</p> <p>This is constructed as a categorical variable to account for its non-normal distribution.</p> <p>2011 Update: this is no longer constructed as a categorical</p>

	Intake Measure (abbrev.)	Definition
		variable.
	School Type (schoolTypeP6 and schoolType712)	The school type, where the categories are: Pri/Sec Primary (Prep – Year 6) Secondary (Year 7 – Year 12) Secondary (Year 7 – Year 10) Senior Secondary (Year 10 – 12 or Year 11 – 12) Select Entry 2011 Update: School type is no longer used as an intake variable.
Academic Composition measures - Primary Only	P-2 Assessment of Reading (AoR90pc_LY_P12 and AoR90pc_4Y_P12)	Aggregate percentage of Prep to Year 2 students reading appropriate text levels (5 for Prep, 15 for Year 1 and 20 for Year 2) with >=90% accuracy. This is constructed as a categorical variable to account for its non-normal distribution. 2011 Update: this measure has been replaced by English Online Interview.
	English Online Interview (EOlyr0_LY and EOlyr0_4Y) 2011 Update: This measure has replaced Assessment of Reading.	The mean Prep VELS score against the English Online Interview. Only the Prep data is used, as an “on-entry” academic composition measure. The 4Y measure currently consists of just LY data. When sufficient data are available, the 4Y measure will consist of 2-Year, then 3-Year, then 4-Year data.
	NAPLAN Year 3 (NAPLANyr3Read_LY&4Y , NAPLANyr3Num_LY&4Y, ZNAPLAN_Y3_LY&4Y) Where: Read = Reading Num = Numeracy ZNAPLAN = average of the standardised (z-score) NAPLAN literacy (reading,	The mean NAPLAN scale score achieved by all Year 3 students in the school. Both the latest Year (LY) and two-year figures are used. When sufficient data are available, the 4Y measures will consist of 3-Year and then 4-Year data. 2011 Update: all NAPLAN 4Y

	Intake Measure (abbrev.)	Definition
	writing, spelling, grammar and punctuation) and numeracy (mathematics) tests	measures now consist of 3-Year data.
Academic Composition Measures - Secondary Only	NAPLAN Year 7 (NAPLANyr7Read_LY&4Y, NAPLANyr7Num_LY&4Y)	As above, for Year 7 students.
	NAPLAN Year 9 (ZNAPLAN_Y9_LY and ZNAPLAN_Y9_4Y)	As above, for Year 9 students.
	AIM Year 7 (ZAIM_Y7_LYL5_LY and ZAIM_Y7_LYL5_4Y) (used for VCE only)	The Year 7 AIM scores obtained by students who have at least one VCE study score, regardless of which school the student was enrolled at in Year 7. If these AIM scores cannot be determined for more than 50% of the VCE cohort, the school's average Year 7 AIM scores (five years prior) are used. If there is no AIM data five years prior, the school's average Year 7 AIM scores four years prior are used. The AIM scores (for each test) are then standardised. These standardised scores are then averaged across all literacy and numeracy tests. 2011 Update: the 4Y measure now consists of 3-Year data.

The model – outcome measures

The Accountability and Improvement Framework for Victorian government schools defines three broad and interrelated areas of student outcomes:

- student learning
- student engagement and wellbeing
- student pathways and transitions.

Within these broad areas, we measure outcomes using a defined set of indicators that are generally well understood across our schools. But there are many ways to represent performance using these indicators, so it's worth being precise about how each outcome is defined. Table 2.2 sets out these definitions.

Table 2.2: Outcome measures

	Measure (abbrev.)	Definition
Student Learning	Teacher assessments against the VELs – English and Mathematics (TJEngMathsP6LY and	Across Prep to Year 6, of the two possible progression points that equate to a C grade at each year level, the

	Measure (abbrev.)	Definition
Primary - Student Engagement and Wellbeing	TJEngMathsP64Y)	<p>lower C grade is set to zero. The school's mean score is then calculated relative to this zero point. E.g. a score of 0.25 is 0.25 of a VELS level above the lower C grade.</p> <p>The mean was then calculated for the each dimension of the English and Mathematics domains.</p> <p>To give equal weighting to English and Mathematics, the mean of the two means was calculated.</p> <p>2011 Update: the 4Y measure now consists of 3-Year data.</p>
	Teacher assessments against the VELS – Other (TJotherP6LY and TJotherP64Y)	<p>As above, for all domains of the VELS other than English and Mathematics. All domains are equally weighted.</p> <p>2011 Update: the 4Y measure now consists of 3-Year data.</p>
	NAPLAN Year 3 (NAPLANyr3Read_LY&4Y, NAPLANyr3Num_LY&4Y) Where: Read = Reading Num = Numeracy	<p>The mean NAPLAN scale score achieved by all Year 3 students in the school.</p> <p>Both the latest Year (LY) and two-year (2Y) figures are used.</p> <p>When sufficient data are available, these data will be replaced by 3-Year (3Y) and then 4Y measures.</p> <p>2011 Update: all NAPLAN 4Y measures now consist of 3-Year data.</p>
	NAPLAN Year 5 (NAPLANyr5Read_LY&2Y, NAPLANyr5Num_LY&2Y)	As above, for Year 5.
	Student absence Prep to Year 6 (studabs_P6_LY and studabs_P6_4Y)	The average number of absent days per student for Prep to Year 6 students, where absences are those not related to the curriculum (e.g. sickness, extended family holidays).

	Measure (abbrev.)	Definition
		4Y aggregates use an FTE count of students from 2006 onwards and a headcount prior to 2006.
	School Connectedness – the extent to which students feel they belong and enjoy attending school. (CtoS_LY_56 and CtoS_4Y_56)	Mean scale score on School Connectedness factor of the student <i>Attitudes to School</i> questionnaire, across Years 5 to 6.
Secondary - Student Learning	Teacher assessments against the VELs – English and Mathematics (TJEngMaths710LY and TJEngMaths7104Y)	<p>Across Year 7 to Year 10, of the two possible progression points that equate to a C grade at each year level, the lower C grade is set to zero. The school's mean score is then calculated relative to this zero point. E.g. a score of 0.25 is 0.25 of a VELs level above the lower C grade.</p> <p>The mean was then calculated for the each dimension of the English and Mathematics domains.</p> <p>To give equal weighting to English and Mathematics, the mean of the two means was calculated.</p> <p>2011 Update: the 4Y measure now consists of 3-Year data.</p>
	Teacher assessments against the VELs – Other (TJOther710LY and TJOther7104Y)	<p>As above, for all domains of the VELs other than English and Mathematics. All domains are equally weighted.</p> <p>2011 Update: the 4Y measure now consists of 3-Year data.</p>
	NAPLAN Year 9 (NAPLANyr9Read_LY&4Y, NAPLANyr9Num_LY&4Y) Where: Read = Reading Num = Numeracy	<p>The mean NAPLAN scale score achieved by all Year 9 students in the school.</p> <p>Both the latest Year (LY) and two-year (2Y) figures are used.</p> <p>When sufficient data are available, these data will be replaced by 3-Year (3Y) and then 4Y measures.</p>

	Measure (abbrev.)	Definition
		2011 Update: all NAPLAN 4Y measures now consist of 3-Year data.
	VCE Allstudy (VCE_LY and VCE_4Y)	The average VCE study score achieved by all students in the school across all studies.
Secondary - Student Engagement and Wellbeing	Student absence Year 7 to Year 12 (studabs_712_LY and studabs_712_4Y)	The average number of absent days per student for Year 7 to Year 12 students, where absences are those not related to the curriculum (e.g. sickness, extended family holidays). 4Y aggregates use an FTE count of students from 2006 onwards and a headcount prior to 2006.
	School Connectedness – the extent to which students feel they belong and enjoy attending school. (CtoS_LY_712 and CtoS_LY_4Y)	Mean scale score on School Connectedness factor of the student <i>Attitudes to School</i> questionnaire, across Years 7 to 12.
Secondary - Student Transitions and Pathways	Year 7 to 10 Real Retention (pcRR710_LY and pcRR7104Y)	The percentage of students retained in the school from Year 7 in the reported year minus three to Year 10 in the reported year. 2011 Update: schools operating select entry accelerated learning programs have been given the opportunity to submit real retention data that takes account of their students' acceleration through year levels.
	Percentage of positive exit destinations. (pcExits_LY and pcExits4Y)	Based on data collected by each school in February, the percentage of Year 10 to 12 students from the previous year's cohort who exited to either continue their education and training or to pursue a full time job. The denominator excludes unknown destinations. Destinations not considered "positive" are <i>unemployed – seeking work, unemployed – not seeking work</i> and <i>employed – part-time</i> .

The model – matching academic composition measures to outcomes

As stated above, the regression models for each outcome measure are based on a standard set of independent variables plus one other intake measure to account for the school's academic composition.

The selection of the academic composition measure for each outcome is far from arbitrary. It must make sense and it must be based on evidence. Faced with a choice of academic composition measures, the alternatives were tested to see which of them accounted for the most variation in outcomes between schools. So, for example, the question of whether Prep English Online Interview or Year 3 NAPLAN accounted for more of the variance between schools' Year 5 NAPLAN scores was tested before selecting the Year 3 values. Table 2.3 shows which academic context measure is used for each outcome measure.

Table 2.3: Academic composition measures against Primary and Secondary Outcomes

	Outcome measure (Dependent Variable)	Academic Context Measure (Independent Variable)
Primary Outcomes	TJEngMathsP6LY	ZNAPLAN_Y3_LY
	TJEngMathsP64Y	ZNAPLAN_Y3_4Y
	TJotherP6LY	ZNAPLAN_Y3_LY
	TJotherP64Y	ZNAPLAN_Y3_4Y
	NAPLANyr3Read_LY	EOlyr0_LY
	NAPLANyr3Read_4Y	EOlyr0_4Y
	NAPLANyr3Num_LY	EOlyr0_LY,
	NAPLANyr3Num_4Y	EOlyr0_4Y
	NAPLANyr5Read_LY	NAPLANyr3Read_LYL2
	NAPLANyr5Read_4Y	NAPLANyr3Read_4Y
	NAPLANyr5Num_LY	NAPLANyr3Num_LYL2
	NAPLANyr5Num_4Y	NAPLANyr3Num_4Y
	studabs_P6_LY	ZNAPLAN_Y3_LY
	studabs_P6_4Y	ZNAPLAN_Y3_4Y
	CtoS_LY_56	ZNAPLAN_Y3_LY
	CtoS_4Y_56	ZNAPLAN_Y3_4Y
Secondary Outcomes	TJEngMaths710LY	ZNAPLAN_Y9_LY
	TJEngMaths7104Y	ZNAPLAN_Y9_4Y
	TJother710LY	ZNAPLAN_Y9_LY
	TJother7104Y	ZNAPLAN_Y9_4Y
	NAPLANyr9Read_LY	NAPLANyr7Read_LYL2
	NAPLANyr9Read_4Y	NAPLANyr7Read_4Y
	NAPLANyr9Num_LY	NAPLANyr7Num_LYL2

Outcome measure (Dependent Variable)	Academic Context Measure (Independent Variable)
NAPLANyr9Num_4Y	NAPLANyr7Num_4Y
VCE_LY	ZAIM_Y7_LYL5_LY
VCE_4Y	ZAIM_Y7_LYL5_4Y
studabs_712_LY	ZNAPLAN_Y9_LY
studabs_712_4Y	ZNAPLAN_Y9_4Y
RR710pct_LY	ZNAPLAN_Y9_LY
RR710pct_4Y	ZNAPLAN_Y9_4Y
pctExits_LY	ZNAPLAN_Y9_LY
pctExits_4Y	ZNAPLAN_Y9_4Y
CtoS_LY_712	ZNAPLAN_Y9_LY
CtoS_4Y_712	ZNAPLAN_Y9_4Y

Addressing differences between Primary and Secondary schools

All regressions are split into two groups: one for schools with Prep to Year 6 students and one for schools with students in Years 7 to 12.

The regression analysis requires that, for any outcome measure, the school has all the intake measures. If just one intake measure is missing, no result is calculated. Therefore it is necessary to create separate models for schools with P-6 and 7-12 students. Schools with students in both categories (such as P-12 and P-10 schools) will get results from both models.

Addressing differences in school size

To help address the effect of school size, three approaches have been taken. Firstly, four-year averages are being used (see tables 2.1 and 2.2, above). Second, the number of school enrolments is included as an intake measure. Third, each regression is performed separately for large and small primary schools (where small primary schools are those with enrolments less than 100). Even then, the measures are less robust for very small schools. As with all school data, context knowledge of the school needs to contribute to the overall interpretation of the data.

2011 Update: small and large secondary schools are no longer analysed separately. The 'enrolments' intake measure adequately accounts for small and large secondary schools.

New schools

Recently opened schools will not have data available for all years.

Privacy

For schools with less than three students in an outcome measure, the intake adjusted school performance results are suppressed.

Outliers

To address the question of outliers (outliers are the data that deviate markedly from the vast majority of schools – they usually represent a one-off occurrence and can have a distinct impact on the overall measures if included), where a school's standardised residual is $> (abs+/-3)$, the school was removed from the analysis and given a standardised residual of $+/-3$ as appropriate.

Output from SPSS

The SPSS output from all the regressions is available upon request. Please email the School Performance Data unit (school.performance.data@edumail.vic.gov.au) to request the output.

The model - possible future enhancements

Mobility as intake measure

The current mobility measure (based on the August census, the percentage of students who had enrolled in the school after the February census of the same year) is used as an intake measure in this first version of the model for real retention only. The measure is considered to be a fairly weak measure of mobility. A much stronger measure would be the retention of students from years 3 to 5, or 7 to 9 according to NAPLAN. When 2010 NAPLAN data becomes available a new mobility measure will be developed and tested in the model.

2011 Update: the new 'stability' measure using NAPLAN matched cohort data has now replaced Mobility.

New data sets

As they become available, new data sets will be incorporated into the intake adjusted school performance modelling (e.g. English Online Interview).

2011 Update: English Online (EOI) now replaces Assessment of Reading as an academic context measure.

Note that data sets can only be added if state-wide data is available. For example, On Demand Testing is not a required data collection and therefore could not be included.