Policy Insights

FIVE CHALLENGES IN AUSTRALIAN SCHOOL EDUCATION

GEOFF N MASTERS AO

ISSUE #5 MAY 2016

Australian Council *for* Educational Research

ACER

CONTENTS

FIVE CHALLENGES IN AUSTRALIAN SCHOOL EDUCATION

GEOFF N MASTERS AO

INTRODUCTION

There is much to celebrate about Australia's schools.

By international standards, our students perform well. The reading and mathematics levels of Australian 15 year olds in the Programme for International Student Assessment (PISA) are above the Organisation for Economic Co-operation and Development (OECD) average and above those in the United States and the United Kingdom. The OECD classifies Australian schools as 'high-quality and high-equity', meaning that not only do our 15 year olds perform above the OECD average, but the impact of socioeconomic background on student performance in Australia is lower than the OECD average (OECD, 2013a).

However, quality schooling can never be taken for granted. All countries are working to improve the performances of their schools, and some countries appear to be more successful in this than others. For example, in a number of countries – including Germany and South Korea – performances in PISA improved significantly between 2000 and 2012. A few countries achieved significant improvements in both quality and equity. In the same period, performances in Australia steadily declined.

In 2012 the Commonwealth Government established a long-term goal for Australia's schools. This goal was incorporated into the Australian Education Act 2013, which identifies 'national targets' including: 'for Australia to be placed, by 2025, in the top five highest performing countries based on the performance of school students in reading, mathematics and science' and 'for the Australian schooling system to be considered a high-quality and highly equitable schooling system by international standards'.

This is an ambitious goal given the improvements that some other countries are now making. Australian students who will be in Year 10 in 2025 are currently in Year 1. Over the next nine years it will be possible to monitor whether these students are on track to be among the best in the world by 2025. And to achieve this goal we will need to be clear about what it will take to lift levels of reading, mathematics and science achievement to world-class standards.

A starting point is to recognise some of the challenges we face. Here are five facts about schooling in Australia at the present time.

THE READING AND MATHEMATICAL LITERACY LEVELS OF AUSTRALIAN 15 YEAR OLDS HAVE DECLINED SIGNIFICANTLY SINCE AT LEAST THE TURN OF THE CENTURY

Over the first 12 years of this century, Australian students completed their compulsory study of mathematics and science with declining levels of 'literacy' – that is, declining abilities to apply fundamental concepts and principles in real-world contexts. In mathematical literacy, the top 10 per cent of Australian students now perform at about the same level as the top 40 per cent to 50 per cent of students in Singapore, South Korea and Chinese Taipei (Thomson, De Bortoli, & Buckley 2013). And while reading, mathematical and scientific literacy levels declined in Australia between 2000 and 2012, levels in a number of other countries improved. One consequence was that the average performance gap between Australian and South Korean 15 year olds in mathematics widened by the equivalent of about a full year of school over this period (OECD, 2013a).

At the same time, Australia has seen a long-term decline in the proportion of students choosing to study advanced subjects – particularly advanced mathematics and science subjects – in the senior secondary school. National Year 12 participation rates in physics and advanced mathematics have been declining steadily for the past two decades (Kennedy, Lyons, & Quinn, 2014).

THERE ARE GROWING DISPARITIES BETWEEN AUSTRALIA'S SCHOOLS AND THESE DISPARITIES ARE INCREASINGLY ASSOCIATED WITH SOCIOECONOMIC BACKGROUND

Most countries recognise that quality schooling and high levels of overall educational performance depend on reducing disparities between schools. High-performing systems focus on ensuring that all schools deliver high-quality education, particularly by reducing differences related to socioeconomic background. In countries that succeed in doing this, the quality of a student's school experience is much less dependent on which school they attend. For example, in Finland in the period 2000 to 2012, only five per cent to nine per cent of the total variance in student performance in PISA was associated with differences between schools.

In Australia, the percentage was considerably greater and increased steadily from 20 per cent in 2000 to 28 per cent in 2012. Not only is there evidence that Australia's secondary schools became increasingly different from each other over this period, but these performance disparities also became increasingly associated with average socioeconomic background (Ainley & Gebhardt, 2013).

LARGE NUMBERS OF AUSTRALIAN STUDENTS ARE FALLING BEHIND YEAR-LEVEL EXPECTATIONS AND ARE NOT MEETING MINIMUM STANDARDS

Based on performances in PISA, the OECD estimates that 40 000 Australian 15 year olds (14 per cent of students) lack the reading skills required to participate adequately in the workforce and to contribute as productive future citizens. The situation is worse in mathematics, where 57 000 Australian 15 year olds (20 per cent of students) fail to achieve this minimum international standard (Thomson, et al., 2013). Many of these students have performed below year-level expectations for much, if not all, of their schooling.

By international standards, Australia does not have an unusually large percentage of underperforming 15 year olds; some countries have significantly higher percentages. Nevertheless, it is of concern that so many Australian students fail to meet minimally acceptable standards and that many fall further behind with each year of school. And it is instructive that a few countries have less than half Australia's percentage of underperforming 15 year olds.

ON STARTING SCHOOL, ONE IN FIVE AUSTRALIAN CHILDREN IS DEVELOPMENTALLY VULNERABLE AND AT RISK OF BEING LOCKED INTO A TRAJECTORY OF LONG-TERM LOW ACHIEVEMENT

According to the Australian Early Development Census (AEDC), 22 per cent of children starting school are developmentally vulnerable in one or more AEDC domains (physical health and wellbeing; social competence; emotional maturity; language and cognitive skills; communication skills and general knowledge). On these figures, Australia has 60 000 developmentally vulnerable children in their first year of formal, full-time school (Commonwealth of Australia, 2016). These children are less likely to make successful transitions to school and are at risk of poorer long-term educational outcomes.

At the same time, children in some population groups are more at risk than others. For example, 42 per cent of Indigenous children are identified as developmentally vulnerable compared with 21 per cent of non-Indigenous children, and 33 per cent of children from the lowest socioeconomic quintile are identified as developmentally vulnerable compared with only 15 per cent of children from the highest socioeconomic quintile.

TEACHING IS BECOMING A LESS ATTRACTIVE CAREER OPTION FOR MORE ABLE SCHOOL LEAVERS

Some of the world's highest-performing school systems have succeeded in making teaching a popular career choice among highly able school graduates. In Singapore and Hong Kong, for example, teachers are drawn from the top 30 per cent of school leavers. In South Korea and Finland, teachers are drawn from the top 10 per cent. In these high-performing countries, places in teacher education courses are strictly limited and competition for entry is intense (Barber & Mourshed, 2007).

Although it is an ambition of governments in Australia to recruit teachers from the top 30 per cent of the population, most school leavers currently being offered places in initial teacher education courses have an Australian Tertiary Admission Rank (ATAR) below 70. And there has been a recent decline in the percentage of offers made to students with ATARs above 70: from 49 per cent in 2013 to 45 per cent in 2014, to 42 per cent in 2015. By contrast, between 80 per cent and 86 per cent of offers to science and engineering courses were made to school leavers with ATARs above 70 (Commonwealth of Australia, 2015).

These five observations expose some of the challenges we face in improving the quality and equity of school education in this country. The challenges include:

1. equipping students for the 21st century, including by increasing reading, mathematical and scientific literacy levels
2. reducing disparities between Australia's schools, particularly along socioeconomic lines, by ensuring that every student has access to an excellent school and excellent teaching
3. reducing the 'long tail' of underachieving students who fall behind year-level curriculum expectations and thus fail to meet minimum international standards
4. getting all children off to a good start, by reducing the number of children who begin school with low levels of school readiness and so are at risk of ongoing low achievement
5. raising the professional status of teaching, by increasing the number of highly able school leavers entering teaching.

Although some of these challenges are more pressing in some parts of Australia than others, these are *national* challenges that require the ongoing attention of every government and education system and provide the core of a national improvement agenda for Australia's schools.

We have good measures of current performance in relation to each of these challenges and thus key performance indicators (KPIs) for monitoring national progress over time.

EQUIPPING STUDENTS FOR THE 21ST CENTURY

The first challenge we face in school education is to identify and develop the knowledge, skills and attributes required for life and work in the 21st century. This is an ongoing educational challenge.

There are several reasons for questioning how well schools are currently equipping students for life beyond school.

First, there has been a long-term decline in the ability of Australian 15 year olds to *apply* what they are learning to everyday problems. This decline is evident in performances in PISA (see Figure 1). Over the first 12 years of this century, Australian students completed their compulsory study of mathematics and science with declining levels of 'literacy' – that is, declining abilities to apply fundamental concepts and principles in real-world contexts (Thomson, et al., 2013).

These declines are occurring at a time when literacy levels in a number of other countries are improving and when Australia requires a more literate citizenry. As a nation we require adults who can engage in a discerning way with sophisticated information about a growing number of complex societal and environmental challenges.

Second, we have witnessed a long-term decline in the proportion of Year 12 students choosing to study advanced subjects – especially advanced mathematics and science subjects (Kennedy, Lyons, & Quinn, 2014). For example, the national participation rates in physics and advanced mathematics have been declining steadily for the past two decades (see Figure 2).

These declines are occurring at a time when the economy and an increasing number of occupations are requiring graduates with advanced science, technology, engineering and mathematics (STEM) skills. Long-term trends in participation rates raise questions about the future supply of STEM specialists (including mathematics and science teachers) and about the implications for Australia's ability to compete and contribute to international research and advances in these fields.

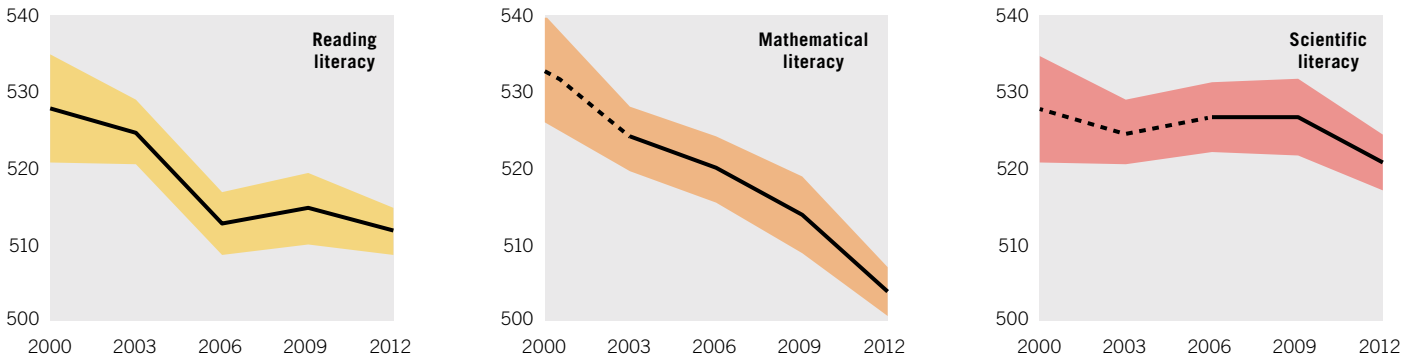

Figure 1 Average performance of Australian 15 year olds in reading, mathematical and scientific literacy (2000–2012)

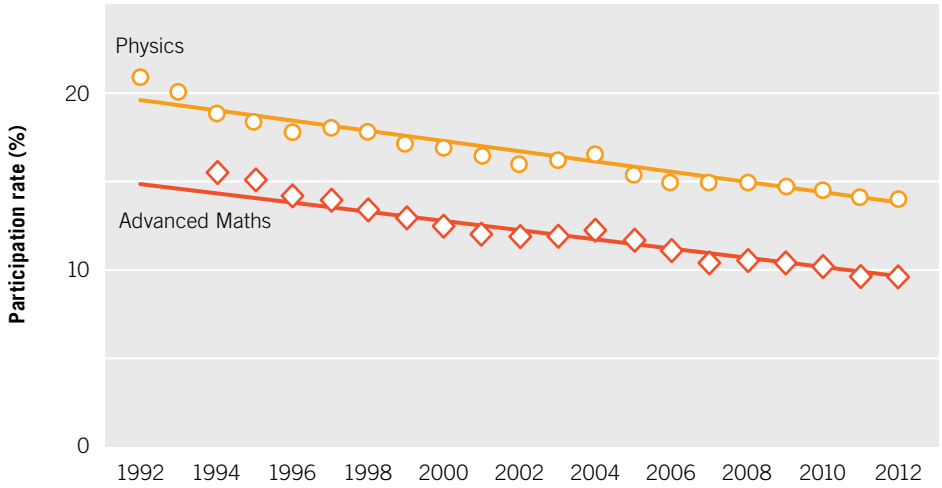

Figure 2 National participation rates in Year 12 physics and advanced mathematics (1992–2012)

There are other reasons for questioning how well we are preparing students for life and work in the 21st century:

- current curricula are often dominated by substantial bodies of factual and procedural knowledge, at a time when it is increasingly important that students can apply deep understandings of key disciplinary concepts and principles to real-world problems
- school subjects tend to be taught in isolation from each other, at a time when solutions to societal challenges and the nature of work are becoming increasingly cross-disciplinary
- school curricula often emphasise passive, reproductive learning and the solution of standard problem types, at a time when there is a growing need to promote creativity and the ability to develop innovative solutions to entirely new problems
- assessment processes – especially in senior secondary school – tend to provide information about subject achievement only, at a time when employers are seeking better information about students' abilities to work in teams, use technology, communicate, solve problems and learn on the job
- students – especially in senior secondary school – often learn in isolation and in competition with each other, at a time when workplaces are increasingly being organised around teamwork and are requiring good interpersonal and communication skills
- school curricula tend to be designed for delivery in traditional classroom settings, at a time when new technologies are transforming how courses are delivered and learning takes place.

Challenges of these kinds will not be addressed by changes to the school curriculum alone. They also depend on investments in teacher quality, changes in pedagogy (*how* curriculum content is taught) and the alignment of assessment processes to new curriculum priorities. Nevertheless, the content and organisation of the curriculum and the emphases given to different forms of learning in the curriculum are important determinants of student engagement and learning outcomes.

A NATIONAL KEY PERFORMANCE INDICATOR

Although there is much more to the school curriculum than literacy and numeracy, students' abilities to read and understand different forms of written material and to apply mathematics to everyday problems are among the most important outcomes of an effective education. These are building blocks for many other curriculum areas and essential skills for life and work beyond school. It is for this reason that many countries monitor the literacy levels of 15 year olds through the OECD's PISA surveys. For Australia, a challenge is to develop higher levels of these skills by the completion of secondary schooling.

A simple measure of success in achieving this goal is available through PISA. Figure 3 shows changes in Australia's mean reading and mathematical literacy results since 2000. Reading literacy declined by 16 points and mathematical literacy by 29 points over this 12-year period.[1] In contrast, the mean reading literacy level in Germany increased by 24 points over the same period. The immediate goal should be to arrest this decline in Australia's performance. The longer-term goal should be to return the performances of Australian students to at least the levels at the turn of the century.

1 16 points and 29 points represent 0.16 and 0.29 of the international standard deviation in 2000.

	2000	2003	2006	2009	2012
Australia					
Reading literacy	0	-3	-15	-13	-16
Mathematical literacy	0	-9	-13	-19	-29
Germany					
Reading literacy	0	+7	+11	+13	+24

Figure 3 Change in mean student performance in PISA since 2000

A second indicator of success would be an increase in the percentage of Year 12 students choosing to study advanced subjects in science, technology, engineering and mathematics. Despite the importance of these disciplines in the 21st century, including their relevance to a growing number of occupations, a declining percentage of students is attracted to studying advanced STEM subjects. A significant reversal in current trends may require a radical rethink of the advanced STEM curriculum.

A third indicator would be a measurable increase in the kinds of general skills and attributes employers are now seeking – for example, students' abilities to work in teams, use technology, communicate, solve problems and learn on the job. Currently we lack valid and reliable measures of 'new metrics' of these kinds. A challenge is to develop credible indicators of such capabilities and to use these indicators to evaluate curriculum reform efforts.

STRATEGIES?

A curriculum that prepares students for life and work in the 21st century is likely to be one that includes an emphasis on:

- deep understandings of subject matter and the ability to apply what is learnt
- the ability to communicate and solve problems in teams
- the ability to think critically and to create novel solutions
- flexibility, openness to change and a willingness to learn continually.

Two specific challenges for a 21st-century curriculum, both of which have been addressed in the recent development of the Australian Curriculum, are to prioritise depth of learning and to promote cross-disciplinary team-based problem-solving.

PRIORITISE DEPTH, NOT BREADTH, OF LEARNING

The balance between breadth and depth is a fundamental consideration in all curriculum design. Breadth relates to the range or amount of content (often factual and procedural knowledge) covered in the curriculum. Depth relates to the development of deep understandings of key concepts and principles and the ability to apply these understandings in unfamiliar contexts. Ideally, a curriculum would promote both broad and deep learning; in practice, an emphasis on one form of learning often limits opportunities for the other.

For example, school curricula are sometimes described as being 'crowded' with content that teachers are expected to cover. The attempt to provide students with some knowledge about a wide range of topics can lead to 'mile-wide, inch-deep' curricula that result in superficial learning, incomplete understandings of core concepts and limited ability to transfer and apply knowledge to unfamiliar contexts.

Although the mastery of factual and procedural knowledge is essential in all school subjects, this knowledge must be more than a list of facts and formulas; it must be organised around core concepts or 'big ideas' of the discipline (Bransford, Brown, & Cocking, 1999). At the present time, the requirement that teachers cover a wide range of curriculum topics often limits the time available to develop deep appreciations of core disciplinary concepts.

PROMOTE CROSS-DISCIPLINARY, TEAM-BASED PROBLEM-SOLVING

An important question at any time is how well the school curriculum is preparing students with the knowledge and skills they will require for life and work beyond school. In the past, the curriculum prepared students with skills and knowledge for a lifetime of work in specific, well-understood occupations. In the 21st century, the curriculum must prepare students for working lives that may span a range of occupations, many of which may not currently exist. An increasing number of students are likely to work in cross-disciplinary teams that form and re-form around emerging challenges, often resulting from advances in digital technologies.

To prepare students for life and work of this kind, the school curriculum needs to include a focus on the collaborative solution of real, complex problems. For example, in the senior secondary school, rather than teaching, assessing and reporting student learning only in the context of traditional disciplines, students could be required to work in teams on cross-disciplinary challenges. Through these challenges they could be taught to apply disciplinary knowledge and understandings in new contexts and assisted to develop skills in working as a team, creating innovative solutions, communicating, solving problems and using technology. Students' work on such projects could be assessed and reported alongside their subject results, providing evidence of a broader range of 21st-century skills and attributes.

REDUCING DISPARITIES BETWEEN AUSTRALIA'S SCHOOLS

The second challenge is to reduce current disparities in the schooling experiences of students in Australia's most and least advantaged schools. The general challenge is to ensure that all students receive a high-quality education regardless of where they happen to live or the school that they happen to attend.

This is important because the evidence from PISA is not only that Australian literacy and numeracy levels at 15 years of age have been on a steady decline since the year 2000, but also that disparities between Australian secondary schools have been increasing over this time (Ainley & Gebhardt, 2013). Schools' performances in PISA in Australia have become increasingly different. Associated with this increasing disparity have been increasing differences in the performances of low- and high-socioeconomic-status schools.

The opposite has been true in some other countries. A number of countries have achieved significant improvements in national literacy and numeracy levels since 2000, and some countries – including Germany, Mexico and Turkey – have succeeded both in improving overall literacy and numeracy levels and in reducing disparities between schools related to socioeconomic background.

In Australia, evidence from a range of assessment programs reveals significant between-school disparities in student performance. These differences tend to be related to the socioeconomic contexts in which schools operate. For example, Figure 4 shows average National Assessment Program – Literacy and Numeracy (NAPLAN) Year 9 reading results for schools grouped according to the Index of Community Socio-educational

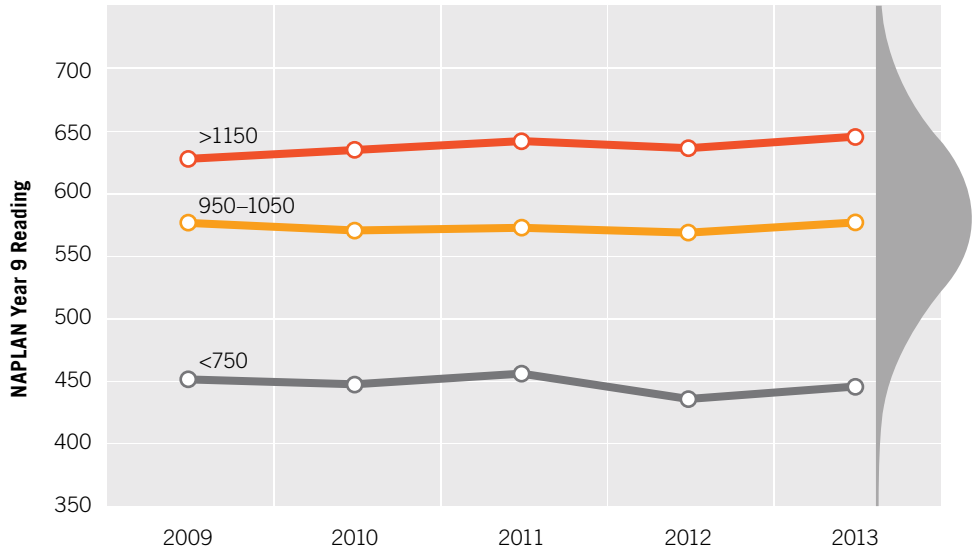

Figure 4 Average Year 9 reading results for schools in three ICSEA groups (2009–2013)

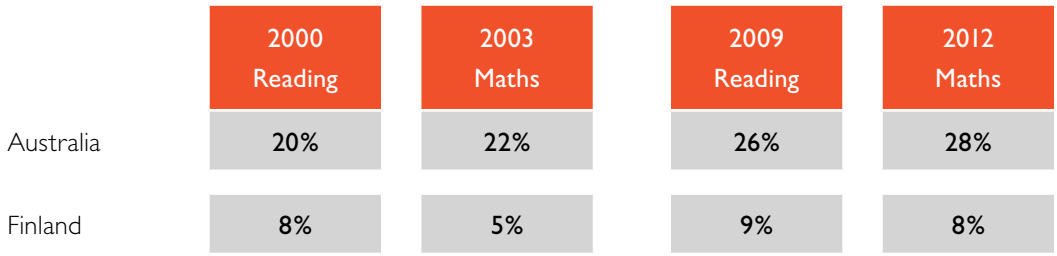

Figure 5 Between-school variance in PISA as a percentage of total variance (Australia and Finland)

Advantage (ICSEA). The national distribution of Year 9 student results in 2013 is on the right. The graph shows that students in these three ICSEA-based groupings of schools have different average reading levels and gives some indication of the influence of socioeconomic factors on between-school differences in student performance (Bonnor & Shepherd, 2014).

Of particular concern is the observation that, since 2000, between-school differences in student performance in PISA have been increasing (see Figure 5). In other words, an increasing percentage of the variance in students' levels of performance in Australia is associated with the school they attend. In Finland, between-school variance is relatively low; how students perform is not much associated with the particular school they attend. At the other extreme, in countries that stream students into different kinds of secondary schools (for example, academic and vocational), between-school variance is much larger than in Australia.

The Australian percentages in Figure 4 may reflect greater between-school differences in mathematics than in reading. Nevertheless, significant increases occurred over these nine-year periods in both reading and mathematics.

A NATIONAL KEY PERFORMANCE INDICATOR

A straightforward national indicator of disparities between Australia's schools is the percentage of total variance in students' performances attributable to 'between-school' differences (with the remaining variance being 'within-school').

This percentage could be calculated at 15 years of age (based on PISA) for the learning domains of reading, mathematics and science. A parallel set of between-school variance indicators could be developed for NAPLAN literacy and numeracy. The regular calculation of this key performance indicator would provide a basis for monitoring changes in the extent to which levels of student achievement are associated with the particulars of the schools they attend.

Increases in this indicator over time may be the result of increasing 'residualisation' (that is, the concentration of lower-performing students in particular schools), increasing disparities in the quality of education being delivered in different schools, or both.

This proposed measure of between-school variance would provide information about

overall disparities between Australia's schools, but not about factors that may be associated with these disparities (such as the quality of educational delivery, socioeconomic residualisation and the possible role of school sectors). Secondary indicators may be useful for monitoring the impact of such factors – for example, to monitor the extent to which differences between Australian schools are associated with socioeconomic status.

An immediate national objective should be to reverse the current trend as reflected in PISA. A short-term objective would be to reduce between-school differences to levels that existed at the turn of the century. A long-term objective would be to make student outcomes still less dependent on which school they attend, the socioeconomic area in which they live, or school sector.

International experience shows that education policy decisions can either increase or reduce disparities between a nation's schools. For example, since the 1970s, Finland has implemented a comprehensive and fully publicly funded school system that enrols all children regardless of their socioeconomic background or personal abilities and characteristics (Sahlberg, 2007). There are few private schools. Those that exist are given a government grant comparable to that for state schools and are prohibited from charging tuition fees or making selective admissions. At the other extreme, countries that have adopted policies to stream students into different kinds of secondary schools have created large between-school differences in student performance (between-school variance above 60 per cent). Recently, a number of countries have made policy changes in the face of evidence that improved national performance is associated with reduced disparities between schools.

STRATEGIES?

> *Ensuring consistently high standards across schools is a formidable challenge for any school system. Some performance differences between schools may be related to the socioeconomic composition of the school's student population or other characteristics of the student body. School location may also explain differences between schools … Between-school differences in performance may also be related to the quality of the school or staff or to the education policies implemented in some schools and not in others. (OECD, 2013b. pp. 44–46)*

In OECD countries generally, a large percentage of between-school variation in student performance is 'explained' by differences in students' and schools' socioeconomic circumstances. In Australia in 2012, 55 per cent of the observed between-school variance in PISA mathematics was associated with differences in schools' average socioeconomic backgrounds.

Although between-school differences in student performance are closely associated with socioeconomic status in all OECD countries, some countries have been more successful than others in reducing the impact of socioeconomic disadvantage. Explicit government policies to minimise impact are often at the heart of their success.

A number of policies could help to reduce between-school disparities.

MINIMISING STUDENT RESIDUALISATION

Disparities between a nation's schools are smallest when the student population is distributed evenly across all schools – that is, when lower-performing students or students from poorer socioeconomic backgrounds are not concentrated in particular schools. Government policies are capable of both increasing disparities (for example, by creating different kinds of schools and streaming students by ability) and reducing disparities (for example, by limiting school fees and prohibiting selective admissions). What a government can realistically do to minimise residualisation will depend on the national context. The important point is that education policies can make a difference to levels of student residualisation and thus to between-school disparities in student outcomes.

MAXIMISING ACCESS TO QUALITY TEACHERS AND LEADERS

Disparities between a nation's schools can also be reduced by ensuring that high-quality teaching and school leadership are more equitably distributed across all schools. To the extent that the most effective teachers and school leaders are concentrated in particular schools, while other schools struggle to recruit and retain highly able teachers and leaders, between-school disparities in student performance are increased. In some education systems, it is not uncommon for less effective teachers and leaders to be moved over time into less 'attractive' schools – usually those that face the biggest challenges and are most in need of high-quality teaching and leadership.

PROMOTING EFFECTIVE SCHOOL IMPROVEMENT PRACTICES

Between-school disparities in student performance also are influenced by the extent to which some schools implement more effective day-to-day practices than others. Highly effective practices include creating a school culture of high expectations; setting an explicit and shared school improvement agenda; creating opportunities for teachers to collaborate in evaluating and improving their day-to-day teaching; providing professional learning focused on improved teaching practices; identifying and addressing the needs of individual learners; and monitoring student progress and providing feedback in forms that guide next steps in learning (Masters, 2012). Education systems and governments are in strong positions to support all schools in their use of evidence-based practices of these kinds.

Overall levels of national expenditure on schools are generally not highly correlated with measures of student performance or equity. However, there is international evidence that *how* resources are used does make a difference. The OECD has concluded that improvements in national literacy and numeracy levels tend to be associated with the more equitable distribution of resources across schools. When national resources are used to minimise student residualisation, to ensure that every school has access to high-quality teaching and school leadership, and to promote the use of effective, evidence-based practices in every school, it is more likely that every student will receive a high-quality education regardless of the school they attend.

REDUCING THE 'LONG TAIL' OF UNDERACHIEVEMENT

The third challenge we face in school education is to find better ways to meet the learning needs of the many students who fall behind in our schools, fail to meet year-level expectations (often year after year) and, as a consequence, become increasingly disengaged.

The OECD estimates that approximately 40 000 Australian 15 year olds (that is, one in seven students) fail to achieve an international baseline proficiency level in reading. After 10 or more years of school, these students lack the reading skills that the OECD believes are required to participate adequately in the workforce and to contribute as productive citizens.

The situation is worse in mathematics, where an estimated 57 000 Australian 15 year olds (that is, one in five students) fail to achieve the international baseline level. At the completion of their compulsory study of mathematics, these students lack the mathematical knowledge and skills the OECD judges to be adequate for life beyond school.

By international standards, Australia does not have an unusually large percentage of 15 year olds performing below the international baseline. Some countries have significantly higher percentages. Nevertheless, it is of concern that so many Australian 15 year olds are failing to achieve minimally adequate levels of reading and mathematical literacy. And it is instructive that a few countries have less than half Australia's percentage of underperformers.

Students who perform below expectation at 15 years of age generally have performed below year-level expectations for much, if not all, of their schooling. They tend to start each school year behind most of their age group and are poorly equipped for the material they are about to be taught. Most struggle, and this is reflected in their poor performance on the year-level curriculum. Many receive low grades year after year, reinforcing the message that they are not succeeding at school – or worse, that they are inherently poor learners.

In Australia, as in many other countries, part of the policy response to underachievement has been to set higher standards and to hold students, teachers and schools accountable for achieving those standards. Curricula have been developed that make explicit the standards that all students in each year of school are expected to meet. And we have made it a national requirement that teachers judge and grade students (using A to E or equivalent) on how well they achieve year-level curriculum expectations.

In other words, the policy response has been to confirm existing practice – to set clear curriculum expectations for each year of school and to judge and grade all students on how well they achieve those expectations. The difference is that these expectations have been redeveloped and agreed nationally, and there has been some strengthening of accountability arrangements.

However, it is questionable whether higher standards and increased accountability will benefit students who have fallen behind in their learning, reduce levels of disengagement among these students, or decrease Australia's 'long tail' of underachievement. Progress in addressing these challenges almost certainly requires a different set of strategies.

A NATIONAL KEY PERFORMANCE INDICATOR

One indicator of progress in reducing Australia's long tail of underachievement would be a reduction in the percentage of 15 year olds not meeting the OECD's baseline proficiency levels as measured by PISA. Figure 6 shows these percentages for reading, mathematical and scientific literacy in 2012. The corresponding percentages for some of the world's highest-performing education systems also are shown, indicating the levels that some countries have achieved.

STRATEGIES?

The organisation and delivery of school education have been largely unchanged for decades. Although composite classes are common, students tend to be grouped into year levels, by age, and to progress automatically with their age peers from one school year to the next. A curriculum is developed for each year of school, students are placed in mixed-ability classes, teachers deliver the curriculum for the year level they are teaching, and students are assessed and graded on how well they perform on that curriculum.

Underpinning this practice is a tacit belief that the same curriculum is appropriate for all, or almost all, students of the same age. This assumption might be appropriate if students of the same age commenced each school year at more or less the same point in their learning. But this is far from the case; the most advanced students commencing any year of school are typically five to six years ahead of the least advanced students. This variability in

	Reading literacy	Math. literacy	Scientific literacy
Australia	14	20	13
Shanghai	3	4	2
Hong Kong–China	6	9	5
Korea	7	9	6

Figure 6 Percentage of 15 year olds performing below the international baseline proficiency level in PISA (2012)

students' levels of achievement and learning readiness is often underestimated.

As a consequence, the learning needs of some students are not well met. Year-level expectations can be much too ambitious for some less-advanced students and not sufficiently ambitious for more advanced students. The challenge for teachers is to meet all students at their points of need with learning opportunities that stretch and extend them.

Strategies in this area could be built around a focus on student progress.

DIAGNOSING WHERE STUDENTS ARE IN THEIR LEARNING

An alternative to assuming that individuals' levels of readiness and learning needs can be reasonably well inferred from their age or year level is to undertake assessments to establish where students are in their learning. Assessments commonly are undertaken after teaching to determine how well students have learnt what they have been taught. However, to maximise the probability of successful teaching and learning, information is required about where students are in their long-term progress before teaching commences. This information can be collected at varying levels of diagnostic detail. For example, teachers may wish to establish individuals' overall levels of achievement in an area of learning, but also to confirm that they have mastered particular prerequisite skills and/or understandings.

The collection of detailed information about where individuals are in their learning prior to commencing teaching is not yet routine practice in many schools.

PERSONALISING TEACHING AND LEARNING

The purpose of diagnosing where students are in their learning before commencing teaching is to ensure that learning opportunities are well targeted on individuals' current levels of achievement and readiness. It is now well established that learning is most likely when learners are given activities at an appropriate level of challenge – beyond their comfort zone in what Vygotsky (1978) called the 'zone of proximal development' – where learners can succeed, but often only with assistance. Differentiated teaching and personal learning plans are widely used in schools. But these practices sometimes compete with an alternative (policy) view that the best way to raise standards is to hold all students to the same high expectations, coupled with a belief that this is more 'equitable' than recognising that students have different learning needs. Improved outcomes for less advanced students depend on establishing in some detail the points individuals have reached in their learning and then providing targeted teaching to address specific skill deficits and misunderstandings and to establish stretch targets for further growth. New technologies have the potential to assist in these diagnostic and personalisation processes.

MONITORING LEARNING PROGRESS OVER TIME

An alternative to simply holding all students in the same year of school to the same year-level expectations and judging and grading them on how well they achieve those expectations is to expect every student to make excellent progress in their learning, regardless of their starting point. In this way, what it means to learn successfully is redefined as the progress (or growth) that learners make. Rather than judging less advanced students as 'poor performers' year after year, the progress these students make is made visible and acknowledged. While every student is expected to achieve high standards eventually, this approach recognises that, because of their less advanced starting points, some students take longer to reach high standards than others. It also recognises that the best way to build students' self-confidence is not to judge and label them as poor learners year after year, but to help them see and appreciate the progress they are making.

SHARING PROGRESS WITH PARENTS AND FAMILIES

School reports typically show how students have performed against year-level expectations and/or the performances of other students. Such information is likely to be of continuing interest to parents. Much less common is information about the progress students have made in their learning over a semester or school year – information that better indicates the amount of learning that has occurred. This information is important because some less advanced students can make good progress during a school year even though they may still be below year-level expectations. It is important that parents appreciate this progress rather than concluding from students' low grades that they are poor learners. Failure to recognise and report progress not only provides parents with an incomplete picture of learning, but also can undermine students' understanding of the relationship between effort and success.

The long tail of underachievement is also a long tail of disenchantment with school. Many less advanced students remain or fall further behind with each year of school and become increasingly convinced that they are poor learners and that school is not for them. By the middle years of school, many of these students have become disenchanted and disengaged. As a nation, we cannot afford to have large numbers of young people marginalised in this way. Part of the solution lies in more flexible ways of organising teaching and learning to better target individuals' current levels of achievement and learning needs. Another part of the solution lies in reconceptualising what it means to learn successfully – defining success and failure not so much in terms of age/year-level expectations as the progress that individuals make in their learning, regardless of their starting points. In short, the long tail of underachievement will be reduced by expecting and ensuring that every student makes excellent progress every year.

GETTING ALL CHILDREN OFF TO A GOOD START

The fourth challenge we face in improving quality and equity in our schools is to better address the learning needs of the many children who, on entry to school, are at risk of being locked into trajectories of long-term low achievement.

By Year 3, there are wide differences in children's levels of achievement in learning areas such as reading and mathematics. Some children are already well behind year-level expectations and many of these children remain behind throughout their schooling. Many are locked into trajectories of 'underperformance' that often lead to disengagement, poor attendance and early exit from school.

Trajectories of low achievement often begin well before school. Differences by Year 3 tend to be continuations of differences apparent on entry to school when children have widely varying levels of cognitive, language, physical, social and emotional development. Some children are at risk because of developmental delays or special learning needs; some begin school at a disadvantage because of their limited mastery of English or their socioeconomically impoverished living circumstances; and some, including some Indigenous children, experience multiple forms of disadvantage.

According to the Australian Early Development Census (AEDC), as shown in Figure 7, 22 per cent of children starting school are 'developmentally vulnerable' in one or more AEDC domains (physical health and wellbeing; social competence; emotional maturity; language and cognitive skills; communication skills and general knowledge). On these figures, Australia has 60 000 developmentally vulnerable children in their first year of formal, full-time school (Commonwealth of Australia, 2016). On average, these children are less likely to make successful transitions to school and are at risk of poorer long-term educational outcomes.

At the same time, children in some population groups are more at risk than others. For example, 42 per cent of Indigenous children are identified as developmentally vulnerable compared with 21 per cent of non-Indigenous children, and 33 per cent of children from the lowest socioeconomic quintile are identified as developmentally vulnerable compared with only 15 per cent of children from the highest socioeconomic quintile (Figure 8).

A NATIONAL KEY PERFORMANCE INDICATOR

National progress in reducing the number of children who begin school at risk of ongoing low school achievement can now be monitored through the AEDC. For example, between 2009 and 2015, the percentage of children judged to be developmentally vulnerable in one or more of the AEDC domains declined from 23.6 per cent to 22 per cent.

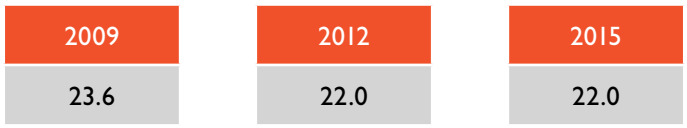

Figure 7 Percentage of children in their first year of full-time school judged to be developmentally vulnerable in one or more AEDC domains (2009–2015)

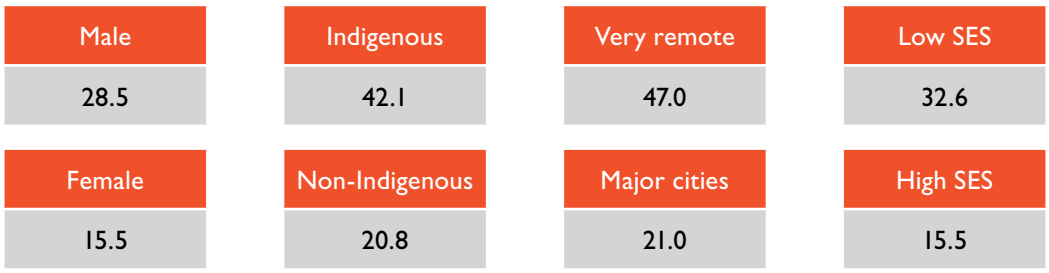

Figure 8 Percentage of children in various population groups judged to be developmentally vulnerable in one or more AEDC domains (2015)

At a finer level of detail, the AEDC allows the monitoring of national progress in reducing the percentages of 'developmentally vulnerable' children within particular population groups.

STRATEGIES?

The challenge of addressing the learning needs of children who begin school well behind the majority of their age peers is sometimes described as the problem of children who 'enter school not yet ready to learn'. These children are considered 'unready' for school because of early cognitive and/or non-cognitive 'deficits'. The implication is that more needs to be done by parents, preschool teachers and other professionals to ensure that all children are 'school ready'.

In reality, children are born ready to learn. They enter school ready to learn. The problem is not that some children enter school not yet ready to learn, but that some children enter school not yet ready to learn what schools are about to teach them or to function effectively in a school environment. Any 'deficit' is a gap between where individual children are in their learning and development and the standardised curriculum and expectations of the first year of school.

Children who lag behind their age peers on entry to school often become locked into trajectories of long-term low achievement. Some fall further behind with each year of school and ultimately have poorer long-term outcomes in areas such as employment, teenage pregnancy, mental health and crime

(Australian Research Alliance for Children and Youth, 2007).

Although the traditional focus has been on ensuring that all children are ready for school, equally important is ensuring that schools are ready and able to respond to the very different stages that children have reached upon entry to school. In other words, there are twin challenges: to support and promote the progress of all children – and particularly children who lag in their development – in the preschool years; and to ensure that all children make a smooth transition into the first year of school by meeting their individual points of need upon entry.

QUALITY EARLY CHILDHOOD EDUCATION AND CARE

Children's learning and development in the preschool years are influenced by a range of factors, including relationships with parents and caregivers, cognitive stimulation, adequate nutrition, health care and safe, supportive environments. Parents' beliefs, attitudes and practices are important to healthy early childhood development, particularly by providing positive engagement, interaction and stimulation.

Also important is universal access to high-quality, affordable, integrated early childhood education and care, especially in the year before full-time school and for developmentally vulnerable children and children from disadvantaged backgrounds. In Australia, universal access is being facilitated through the National Partnership Agreement on Universal Access to Early Childhood Education and the quality of early childhood provision is being addressed through the National Quality Framework (Commonwealth of Australia, 2011).

Quality education and care depend on quality teaching (Elliott, 2006). In Australia, the Early Years Learning Framework provides broad direction to teaching and learning in the preschool years. The Framework guides curriculum decision making and assists in planning, implementing and evaluating quality in early childhood settings (Commonwealth of Australia, 2009).

Also essential are qualified early childhood educators with well-developed understandings of child development, health and safety issues. Effective pedagogy in the preschool years includes the early detection of developmental delays and the implementation of effective intervention strategies, which in turn depend on the ongoing monitoring of early learning and the tracking of children's social and emotional development.

SMOOTH TRANSITIONS INTO SCHOOL

An alternative to viewing early childhood education through the lens of 'school readiness' is to recognise that, at any given age, children are at very different points in their learning and development. Rather than focusing on 'deficits' (gaps between children's entry levels and schools' expectations), the focus during the preschool years and also in the early years of school should be on establishing where children are in their long-term learning and development, and providing individualised support and learning opportunities to promote further progress.

Seamless transitions from early childhood to school often are complicated by differences in approaches, teaching styles and structures in primary schools and early childhood settings. The greater the gap, the more difficult the transition (UNICEF, 2012). Ideally, there would be close collaboration across this transition, with educators meeting and sharing information about learning materials and activities, and assessment approaches and outcomes.

Smooth transitions into school also depend on accurate assessments of where children are in their learning and development on entry to school. Baseline data of this kind are especially important for children who enter school with learning and developmental delays. Accurate assessments allow teachers to provide individualised support, including specialist support (for example, by speech and language therapists) for children who require it. Early childhood educators and parents can make valuable contributions to the collection of information about children's learning and development at the point of transition to school.

Finally, the transition to school is facilitated by planned programs of support and targeted interventions from the moment children start school. The aim should be to ensure a seamless transition by providing optimal learning environments and ongoing close monitoring of progress, especially for children at risk of falling further behind in their learning and development.

RAISING THE PROFESSIONAL STATUS OF TEACHING

One of the biggest challenges we face in school education is to raise the status of teaching as a career choice, to attract more able people into teaching and to develop teaching as a knowledge-based profession.

High-performing countries such as Singapore, Hong Kong, South Korea and Finland have achieved their high-performing status in part by raising the status of teaching as a profession and by ensuring that future teachers are drawn from among their most able school leavers. In Australia, there appears to be an intention on the part of governments that school leavers entering teaching also should be drawn from our most able school leavers. The *Accreditation of Initial Teacher Education Programs in Australia: Standards and procedures* specifies that entrants to initial teacher education should have levels of personal literacy and numeracy 'broadly equivalent to those of the top 30 per cent of the population' (Australian Institute for Teaching and School Leadership, 2011).

The extent to which this is occurring currently can be gauged from the graph in Figure 9, which shows the percentage of education offers made to school leavers in each band of the Australian Tertiary Admission Rank (ATAR). The ATAR, despite its limitations as a selection device, is the best indicator we have of overall performance in Year 12. Figure 9 shows that, while the vast majority of Year 12 offers to science and engineering courses are made to students with ATARs above 70, fewer than half of education offers are made to students with ATARs above 70 (Commonwealth of Australia, 2015).

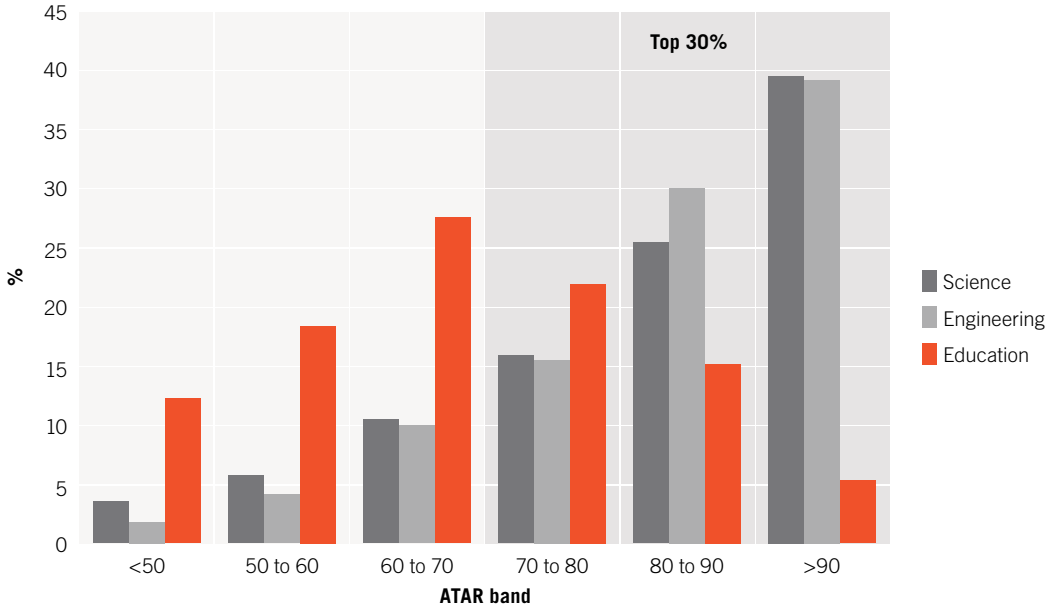

Figure 9 Percentage of Year 12 offers in each ATAR band: science, engineering and education (2015)

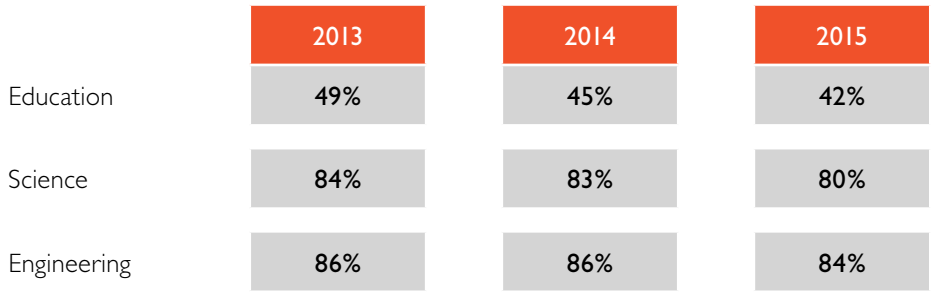

Figure 10 Percentage of Year 12 offers to students with ATARs above 70 (2013–2015)

In this country, we are falling well short of drawing our future teachers from the top 30 per cent of school leavers: and the picture is becoming worse, not better. Over the past three years, the percentage of education offers made to students with ATARs above 70 declined significantly, as shown in Figure 10.

A large proportion of students entering teacher education courses do not come directly from Year 12 and so are not included in these figures. However, the ATARs of non-Year 12 entrants are unlikely to be any higher, and are very likely lower, than those of students being made offers directly from Year 12.

These observations should be of concern because the evidence is clear that the world's highest-performing nations in international achievement studies consistently attract more able people into teaching, resulting in better student outcomes. The McKinsey study of the world's best-performing school systems found that top-performing countries recruit teachers from the top third of school leavers (Barber & Mourshed, 2007). That study also concluded that it is not possible to make substantial long-term improvements to a school system without raising the quality of the people entering teaching. There is a clear lesson here for Australia.

A NATIONAL KEY PERFORMANCE INDICATOR

Given that the world's top-performing school systems recruit the vast majority of their teachers from the top third of school leavers, and Australian governments appear to aspire to do the same, national progress in achieving this goal could be monitored by tracking the percentage of education offers made to Year 12 students with ATARs greater than 70. This percentage would provide a simple national performance indicator.

This is not to say that ATAR is an ideal measure for selecting teacher education students; some applicants with relatively low ATARs can make excellent teachers. However, very high-performing countries, including Singapore and Finland, place a strong emphasis on academic achievement in their selection processes and then also select on the basis of other attributes such as motivation for teaching, willingness to learn and communication skills. The high performance of these countries is due in part to deliberate long-term strategies to recruit future teachers from their best and brightest school leavers.

An immediate objective for Australia should be to reverse the downward trend in the percentage of education offers being made to Year 12 students with ATARs above 70. A short-term objective should be to have *most* Year 12 offers (more than 50 per cent) going to students with ATARs above 70. A long-term objective should be to have the *vast majority* of education offers (for example, 80 per cent) being made to students with ATARs above 70.

International experience suggests that the achievement of such an objective is entirely feasible. A number of countries have succeeded – usually over an extended period of time – in making teaching a highly regarded and sought-after career. The ability of these countries to attract more able students into teaching raised the status of teaching, which in turn resulted in still more able students choosing teaching as a career:

> *Once teaching became a high-status profession, more talented people became teachers, lifting the status of the profession even higher … Where the profession has a low status, it attracts less talented applicants, pushing the status of the profession down further and, with it, the calibre of people it is able to attract. (Barber & Mourshed, 2007, p. 22)*

In some of the world's highest-performing countries, entry to teaching is now as competitive as entry to courses such as engineering, science, law and medicine.

STRATEGIES?

The adoption of a performance indicator to monitor Australia's success in recruiting more able people into teaching is a first step. A second and more important step is to identify strategies for raising the status of the teaching profession and encouraging more able people to choose teaching as a career. Here, the findings of the McKinsey study are encouraging. That study concluded that, in high-performing countries, improvements in the status of teaching were mainly *policy* driven; that there are common strategies and best practices for attracting strong candidates into teaching; and that the right policies can change the status of teaching in a country in a relatively short period of time.

The McKinsey study lists a number of effective policies adopted by these high-performing countries (Barber & Mourshed, 2007).

MAKING TEACHER EDUCATION PROGRAMS HIGHLY SELECTIVE

High-performing countries control entry to teacher education to ensure that the supply of new teachers more or less matches demand. These countries work to ensure that there is not a significant under- or oversupply of graduating teachers. This practice makes teaching more competitive and more highly valued as a career. Limiting the number of students in initial teacher education courses can also result in smaller classes and reduced pressure on professional experience placements.

DEVELOPING EFFECTIVE STUDENT SELECTION PROCESSES

High-performing countries have well-developed mechanisms for selecting students for entry to initial teacher education. These mechanisms are often multi-step processes involving screening, testing and interviewing applicants. Singapore selects only one in six applicants on the basis of academic results, literacy tests and an interview that considers attitude, aptitude and personality. Finland selects only one in 10 applicants using tests of literacy, numeracy, problem-solving, critical thinking and information processing, and an interview that considers motivation to teach and learn, communication skills and emotional intelligence.

PAYING GOOD (BUT NOT GREAT) STARTING SALARIES

High-performing countries pay starting compensation at or above the OECD average. An important consideration appears to be that starting salaries and the salaries of experienced teachers are in line with other professional salaries in the country concerned.

ENSURING RIGOROUS INITIAL AND CONTINUING PROFESSIONAL DEVELOPMENT

High-performing countries establish rigorous initial teacher education courses and set high expectations for teachers' ongoing professional learning. In Finland, policymakers have raised the status of the teaching profession by requiring that all teachers have a master's degree.

Lessons from the world's top-performing nations suggest that a long-term key to reversing the decline in the reading, mathematical and scientific literacy performances of Australian students will be to make teaching more attractive to the best and brightest of our school leavers, and this, in turn, will depend on a critical set of policy changes.

CONCLUSION

There is no shortage of challenges in school education.

Some of the biggest challenges we face can appear frustratingly intractable. Despite reform efforts, increased expenditure on schools, regular government reviews and ongoing calls for change, progress in addressing our most significant challenges is often slow and solutions continue to elude us.

It is not that we do not know what the challenges are. But their roots sometimes lie largely outside the reach of schools or in deeply entrenched educational processes and structures that are difficult to change. A political response is sometimes to focus instead on low-hanging fruit and quick wins – to make changes at the margins where change seems possible. However, real reform and significant progress in improving the quality and equity of Australian schooling depend on tackling our deepest and most stubborn educational challenges.

SCHOOL FUNDING

As in many other countries, government funding of schools has grown significantly in Australia over recent decades. However, this increased expenditure has not produced significantly improved student outcomes (at least not in the areas for which we have good measures). In fact, as this paper has observed, performances often have declined despite increased funding.

It might be concluded from this observation that better funding is not the answer to better educational outcomes. However, a number of other countries have succeeded in raising the performances of their schools at the same time as performances in Australia have declined. This suggests that whether or not increased funding makes a difference depends on how it is applied. Our national challenge is to maximise the impact of government expenditure by targeting it on evidence-based strategies to improve performances in Australian schools.

REFERENCES

Ainley, J., & Gebhardt, E. (2013). *Measure for measure: A review of outcomes of school education in Australia*. Camberwell: Australian Council for Educational Research.

Australian Education Act 2013 (Cth) http://www5.austlii.edu.au/au/legis/cth/consol_act/aea2013210/s3.html

Australian Institute for Teaching and School Leadership. (2011). *Accreditation of initial teacher education programs in Australia: Standards and procedures*. Melbourne: AITSL.

Australian Research Alliance for Children and Youth. (2007). *School readiness*. West Perth: ARACY.

Barber, M., & Mourshed, M. (2007). *How the world's best-performing school systems come out on top*. London: McKinsey and Company.

Bonnor, C., & Shepherd, B. (2014). *School equity since Gonski: How bad became worse*. http://needtosucceed.org/equity-in-australian-schooling-an-update/

Bransford, J.D., Brown, A.L., & Cocking, R.R. (1999). *How people learn: Brain, mind, experience, and school*. Washington: National Academy Press.

Commonwealth of Australia. (2009). *Belonging, being and becoming: The Early Years Learning Framework for Australia*. Canberra: Commonwealth of Australia.

Commonwealth of Australia. (2011). *Early childhood education and care in Australia: A discussion paper prepared for the European Union–Australian Policy Dialogue*, 11–15 April 2011. Canberra: Commonwealth of Australia.

Commonwealth of Australia. (2015). *Undergraduate applications and offers, February 2015*. Canberra: Department of Education and Training.

Commonwealth of Australia. (2016). *Australian Early Development Census national report 2015*. Canberra: Department of Education and Training.

Elliott, A. (2006). Early childhood education: Pathways to quality and equity for all children. *Australian Education Review No. 50*. Camberwell: Australian Council for Educational Research.

Kennedy, J., Lyons, T., & Quinn, F. (2014). The continuing decline of science and mathematics enrolments in Australian high schools. *Teaching Science, 60*(2), 34–46.

Masters, G. (2012). *National School Improvement Tool*. Camberwell: Australian Council for Educational Research. www.acer.edu.au/files/NSIT.pdf

OECD (2013a). *PISA 2012 results – What students know and can do: Student performance in mathematics, reading and science*. Paris: OECD.

OECD (2013b). *PISA 2012 results – Excellence through equity: Giving every student the chance to succeed (Volume II)*. Paris: OECD Publishing.

Sahlberg, P. (2007). Education policies for raising student learning: The Finnish approach. *Journal of Education Policy, 22*(2), 147–171.

Thomson, S., De Bortoli, L., & Buckley, S. (2013). *PISA 2012: How Australia measures up*. Camberwell: Australian Council for Educational Research.

UNICEF. (2012). *School readiness: A conceptual framework*. New York: UNICEF.

Vygotsky, L. (1978). Interaction between learning and development. In V. John-Steiner & M. Cole (Eds.), *Mind in society: The development of higher psychological processes* (pp. 79–91). Cambridge, MA: Harvard University Press.

Previous issues

Issue 1:
Is school reform working?
by Geoff N Masters AO

Issue 2:
The teacher workforce in Australia: Supply, demand and data issues
by Paul R Weldon

Issue 3:
Australian students in a digital world
by Sue Thomson

Issue 4:
Indigenous school attendance: Creating expectations that are 'really high' and 'highly real'
by Tony Dreise, Gina Milgate, Bill Perrett and Troy Meston

FOLLOW US

acer.edu.au

@acereduau

http://acer.ac/linkedin

Policy Insights is published by
Australian Council for Educational Research
19 Prospect Hill Road
Camberwell VIC 3124
Phone: (03) 9277 5555

www.acer.edu.au

ISSN 2204-6631

An initiative of the Centre for Education Policy and Practice

The Centre for Education Policy and Practice promotes the interconnection between research, policy and practice. The Centre investigates the impact of policy and practice in terms of research evidence of what works to meet learners' needs and improve learning outcomes, but also examines ways in which research can be informed by a thorough understanding of the perspectives of policy makers and practitioners. The work of the Centre, addressing all levels of education and training, is organised around three themes: effective teaching; effective institutional leadership; and effective system leadership.
www.acer.edu.au/epp

Design: ACER Creative Services
Printed by: Allanby Press

ABN 19 004 398 145

www.acer.edu.au