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PISA identifies challenges for Australian education

The reading literacy of Australian 15-year-old students has fallen sharply over the past decade, results from the 2009 administration of the OECD Programme for International Student Assessment (PISA) reveal. The Australian national report was released by ACER on 7 December. It shows that Australia's results have also slipped in mathematics but held ground in science.

PISA measures how well 15-year-olds from across the globe are prepared to use their knowledge and skills in reading, mathematics and science to meet real-life challenges near the end of compulsory schooling.

Sixty-five OECD and partner countries took part in PISA 2009 including a nationally representative sample of around 14,000 Australian students from 353 schools. Australia has now participated in four cycles of PISA since its inception in 2000.

"Australian students are still performing well above the OECD average but their results in reading literacy and mathematical literacy have declined significantly over recent years," ACER chief executive Professor Geoff Masters said.

Australian students scored an average of 515 points on the 2009 reading assessments, compared to the OECD average of 493 points. Australia's overall performance declined by 13 score points from 2000 to 2009. The decline is primarily among higher achieving students and is more evident in some states than others.

"Australia was the only high performing country to show a significant decline in reading literacy performance between PISA 2000 and PISA 2009," Professor Masters said.

In mathematics Australian students achieved an average score of 514 points, significantly higher than the OECD average of 496. The result was similar to that achieved in 2006 but down on the 2003 result. The performance of Australian students in scientific literacy remained unchanged from PISA 2006 to PISA 2009 with an average score of 527 points.

Very significant gaps in achievement remain between Australian students by gender, Indigenous status, location and wealth. In some cases these are equivalent to several years of schooling.

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The average reading performance of Indigenous students was significantly lower, by more than two years of schooling, than that of non-Indigenous students. A similar gap in achievement was found for mathematics and science literacy.

In addition, there is a large gender gap in mathematics, with boys outperforming girls that was present in PISA 2006, but before then had not been seen for many years. In reading literacy boys trail girls by the equivalent of around one year of schooling.

Of greatest concern, students from the highest socioeconomic group outperformed students from the lowest socioeconomic group in reading by the equivalent of almost three full years of schooling.

"These achievement gaps place an unacceptable proportion of 15-year-old students at serious risk of not achieving literacy levels sufficient for them to effectively participate in the workforce," Professor Masters said.

"Some Australian teenagers may be trying to enter the workforce and forge a future for themselves with reading, mathematics and science literacy skills equivalent to a Year 7 or 8 education or worse."

The Australian national report, PISA 2009: Challenges for Australian education by Sue Thomson, Lisa DeBortoli, Marina Nicholas, Kylie Hillman and Sarah Buckley, and further information about the PISA assessment is available from the Australian PISA website <http://www.acer.edu.au/ozpisa>

The Australian report was released to coincide with the launch of the international PISA study by the OECD in Paris.

ACER conducts PISA in Australia on behalf of the OECD with funding from the commonwealth and state and territory governments.

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Getting all teachers doing what the best already do

In this opinion article, originally published in [The Australian newspaper](#), ACER's chief executive, [Professor Geoff Masters](#), argues that Australia's mixed results in PISA 2009 reveal a challenge to get all teachers doing what the best already do, and focused and aligned efforts on the part of school leaders and education systems are critical in achieving this.

The OECD's latest report on the reading, mathematical and scientific literacy skills of 15-year-olds contains mixed news for Australia.

PISA (Programme for International Student Assessment) tests were administered to students in 65 countries during 2009. On the positive side, Australian 15-year-olds performed well above the OECD average and were significantly outscored by students in only six countries in reading, twelve countries in mathematics and six in science.

However, Australia was one of only five OECD countries to record a significant decline in reading levels over the preceding nine years. Ten OECD countries recorded significantly improved reading results over the same period. Within Australia, declines were most marked in South Australia and Tasmania where, between 2000 and 2009, the decline in average reading levels was equivalent to a full year of school. Significant declines also were recorded in the mathematics performances of Australian 15-year-olds in the six years to 2009.

One of the reasons for Australia's average decline was a decrease in the number of students performing at advanced international levels. The number of high achievers in reading declined in Australia between 2000 and 2009, and the number of high achievers in mathematics and science declined significantly in some states. Previous international studies showed the top ten per cent of Australian students in mathematics and science performing at about the same level as the top thirty to forty per cent of students in countries such as Singapore and Chinese Taipei. The latest OECD report includes newcomer Shanghai. In Shanghai, fifty per cent of students performed at the same mathematical literacy levels as the top sixteen per cent of Australian students.

There is sobering news, too, on average achievement gaps in this country. The gender gap in mathematics, which appeared to have closed over recent decades, has re-emerged with boys

again significantly outperforming girls. Gaps between Indigenous and non-Indigenous students and between students from the lowest and highest socioeconomic groups in Australia continue to be the equivalent of nearly three years of school.

These OECD findings invite the question of what more we could be doing to lift achievement levels in reading, mathematics and science in Australian schools, particularly among our most disadvantaged students. International research suggests that the answer lies not in bigger government programs or increased expenditure alone, but in improving the quality of everyday classroom teaching. The challenge, it seems, is to get all teachers doing what the best already do, and focused and aligned efforts on the part of school leaders and education systems are critical in achieving this.

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Some of the characteristics of highly effective teaching are now well understood. Outstanding teachers have a sound grasp of the subjects they teach. They also understand how students learn, including the kinds of problems and misunderstandings they commonly develop. They are familiar with, and use, a range of research-based teaching strategies, and they know their students well, including their individual strengths and weaknesses, learning needs, interests and motivations.

School leaders are in powerful positions to influence the quality of classroom teaching. In schools that have been turned around, school leaders usually have been pivotal in driving improved teaching. They do this by creating high expectations, setting clear targets for improvement and monitoring progress over time. Importantly, they encourage teachers to work together to enhance their teaching practices and put in place mentoring and other collaborative learning processes. Highly effective leaders often have strong views about the kinds of teaching they wish to see. They establish school-wide processes and build partnerships with parents and local communities to identify and address individual student needs.

Governments and system leaders also have a crucial role to play in improving the quality of classroom teaching. High-performing systems internationally recognise that the key to increased student performance is high-quality teaching. They place a high priority on attracting more able people into teaching and on giving all teachers a world-class preparation in evidence-based teaching methods. They work to ensure that excellent teaching is distributed across all schools,

including those in disadvantaged communities; that there is clarity about what teachers should be teaching; and that school leaders are developed and supported to lead local improvement efforts.

Australian school reform efforts generally acknowledge the fundamental importance of improving classroom teaching. What is required is a stronger alignment of current initiatives in leadership development, curriculum renewal, teacher recruitment and preparation, the staffing of schools, teacher remuneration and continuing professional development around the common goal of promoting high-quality, evidence-based teaching. Such focus and alignment provide our best hope of arresting declines in student performance and closing gaps for our most disadvantaged students.

This article was originally published in The Australian on 8 December 2010 and can be read online at <http://www.theaustralian.com.au/news/opinion/reading-between-lines-barely-a-pass-for-teachers/story-e6frg6zo-1225967244189>

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Disadvantage in Australian schools

The 2009 OECD Programme for International Student Assessment (PISA) Australian report: Challenges for Australian Education publishes PISA results broken down and analysed by school sector for the first time. The raw results show that students in government schools are outperformed by those in Catholic schools, and students in Catholic schools are, in turn, outperformed by those in independent schools.

These results will not surprise anyone – scans of scores from other tests show similar results. The relative performance of the three school sectors is not the issue, but there are three questions that form the centre of the debate: How much of these differences are based on what the students bring to school with them? How much does the home influence student achievement? How much does a school – or a school sector – influence the achievement of its students? The latest results from PISA suggest a student's socioeconomic background and the socioeconomic background of a school make a big difference to student achievement.

While the primary focus of PISA is assessment in reading, mathematical and scientific literacy, a great deal of background information is also collected from students and schools. The background information gathered from students is used to develop the PISA index of economic, social and cultural status (ESCS), which is used by the OECD and in PISA analyses as a proxy for socioeconomic status. In Australia, a random sample of approximately 50 15-year-old students is taken in each school, so the group average of the student socioeconomic status provides a good estimate of the socioeconomic background of the students' peer group.

Based on the relationship in Australia between socioeconomic background as defined above and performance, Australia has in the previous two cycles of PISA been described as high quality/high equity. However, in the latest cycle of PISA the level of equity was similar to that over the OECD on average, which places Australia as high quality but only average equity.

The impact of socioeconomic background on performance however is a little stronger in Australia than on average across the OECD. In terms of score points, scores on reading literacy are 46

points higher for each extra unit on the ESCS index, whereas for the OECD this increase is only 38 score points.

Furthermore, PISA data show that peer groups of students in government, Catholic and independent schools are quite different. The socioeconomic background of around 16 per cent of students in Catholic schools, 10 per cent of students in independent schools, and 35 per cent of students in government schools is from the lowest quartile. At the other end of the scale, almost 30 per cent of students in Catholic schools, almost 50 per cent of students in independent schools, and 16 per cent of students in government schools are drawn from the highest socioeconomic quartile. The 2009 PISA report examined average achievement for each socioeconomic quartile and found that there was a difference in scores between students in the highest and lowest socioeconomic quartile that equated to almost three full years of schooling.

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If there are such large differences in the socioeconomic profile of government, Catholic and independent sectors, then surely this goes a long way in explaining the performance differences between sectors. The Australian PISA report examines the achievement scores recognising the effects not only of the student's own socioeconomic background but also that of the school they attend. After these adjustments, the scores that result are those which might be obtained, for example, by students from similar socioeconomic backgrounds attending different types of schools.

After the adjustment there was no significant difference found in the average scores of students in government, Catholic and independent schools. In other words, students in the independent or Catholic school sectors can bring with them an advantage from their socioeconomic background that is not as strongly characteristic of students in the government school sector.

The OECD notes that "private schools may realise their advantage not only from the socioeconomic advantage that students bring with them, but even more so because their combined socioeconomic intake allows them to create a learning environment that is more conducive to learning". The advantage gained from this combined socioeconomic intake can be both direct (in terms of more support of learning from home; more exposure to a variety of texts; higher levels of aspirations) and indirect (enabling schools which charge fees the opportunity to offer a range of more personalised supports to students; attract more talented and motivated teachers; and develop a general school climate that is oriented towards higher performance). While socioeconomic background should not be a deterministic factor in student performance, it is an important one.

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ACER's international role in PISA

ACER has a dual role in PISA. In addition to implementing PISA in Australia and writing the national report, ACER leads an international consortium of research organisations and educational institutions to deliver the International PISA project on behalf of the Organisation for Economic Cooperation and Development (OECD).

Before the 14,000 Australian students sat down to tackle the 2009 PISA assessments, each item had been through a rigorous process of development and trial to ensure it could be understood by students from a wide range of language and cultural backgrounds and was based on relevant, everyday situations. All items were then translated into nearly 50 languages to meet the language needs of the 65 participating OECD member countries and partner economies. Item development is just part of the work undertaken by the ACER-led consortium that conducts PISA around the world.

Internationally, ACER's work on PISA includes:

- Leading the development and devising the methodology of procedures required to implement the PISA survey in all participating countries.
- Developing and implementing sampling procedures and assisting with monitoring sampling outcomes across participating countries.
- Leading the development of all assessment instruments in Reading, Mathematics, Science, Problem Solving, Computer-based testing, background and contextual questionnaires;
- Developing purpose-built software to assist in sampling and data capture; and
- Analysing and assisting the OECD to prepare the international report.

The OECD established PISA as a means of assessing and comparing education systems worldwide after discovering it had a number of economic measures of its member countries but no measures of educational achievement. By testing the skills and knowledge of 15-year-olds in three core subject areas, PISA determines how capable students are at applying their skills and knowledge to real-life problems and situations, and whether they can analyse, reason and communicate their ideas effectively. By assessing students at the age when they are nearing the end of compulsory schooling, PISA ascertains whether students are prepared for the challenges of life as young adults.

Since 2000, PISA has been conducted every three years. The continuous cycle of PISA allows for longitudinal trends in educational performance to be monitored.

PISA includes items to assess reading, mathematical and scientific literacy accompanied by stimulus material, which may include text, diagrams or images, and is followed by a questionnaire that asks students about their attitudes and background. This questionnaire seeks to gain information about students' home and school environment to identify possible influences on school achievement.

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The questions used in PISA are carefully developed and selected. Expert groups are consulted, ideas are discussed among participating countries and advice is sought from various boards and groups. Every item included is rated by each country in terms of potential cultural, gender or other biases, as well as the relevance to 15-year-olds' familiarity and level of interest. The questions are tested in field trials in participating countries before they are considered to be part of the main PISA study.

When PISA is conducted every three years a nationally representative sample of 15-year-olds is chosen from each participating country. The sample is carefully designed to ensure that PISA provides an accurate snapshot of educational achievement of the full 15-year-old population.

Once the tests are completed a team of specially trained markers checks them. The data is then sent back to the PISA consortium and collated with that of other countries to create an international database. The database created provides a multitude of information that may eventually be used to inform educational policy in participating countries. Information from the attitude and background questionnaire is used to analyse potential influences on students' performance across and within countries.

The data collected by PISA helps to show the successes of schools in some countries, and the challenges faced by others. It allows countries to compare best practices and to further develop an educational reform agenda appropriate for their particular school system.

This article is based on an overview of PISA in a new publication, which describes projects from ACER's growing range of international work. The first edition of International Developments can be read online at <http://www.acer.edu.au/international/>

More information about PISA from an international perspective can be found on the [OECD PISA website](#)

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ACER Update

Australian national 2009 PISA report released

Focusing on reading literacy as the major domain for the PISA 2009 assessment, the national report, PISA 2009: Challenges for Australian Education examines Australian students' achievement in reading, mathematical and scientific literacy. Results are reported for the states, by gender, for Indigenous students, by location, language background and by socioeconomic background. The full report, a summary report, PISA in Brief: Highlights from the PISA 2009 report, and detailed information about PISA in Australia can be found at the [Australian PISA website](#).

Korea and Finland top OECD's latest PISA survey of education performance

ACER released the Australian national PISA report on 7 December to coincide with the release of the International PISA report by the OECD in Paris. The OECD reported that Korea and Finland top the latest PISA survey of reading literacy among 15-year olds. Asia-Pacific economies made up six of the leading education systems, thanks to strong performances from Hong Kong-China, Singapore, New Zealand and Japan. Canada was the only other country outside Asia to score highly. Further international findings from PISA and the full international report can be downloaded from the [OECD website](#)

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