





Challenges for Australian education

Sue Thomson asks if Australia's above average but declining performance in an international study of reading, mathematics and scientific literacy should be cause for concern.



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The latest report on the reading, mathematical and scientific literacy skills of 15-year-olds from the Organisation for Economic Development (OECD) Programme for International Student Assessment (PISA) contained mixed news for Australia when it was released in December 2010.

The OECD established PISA to help determine 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 who are 15 years old, the age when they are nearing the end of compulsory schooling in many countries, PISA helps to ascertain whether students are prepared for the challenges of life beyond school.

ACER has a dual role in PISA, working to implement the program both internationally and within Australia. ACER has led an international consortium of research organisations and educational institutions to deliver the international PISA project on behalf of the OECD since its inception in 2000. ACER is also responsible for conducting the national PISA study within Australia under contract to the federal and state and territory governments.

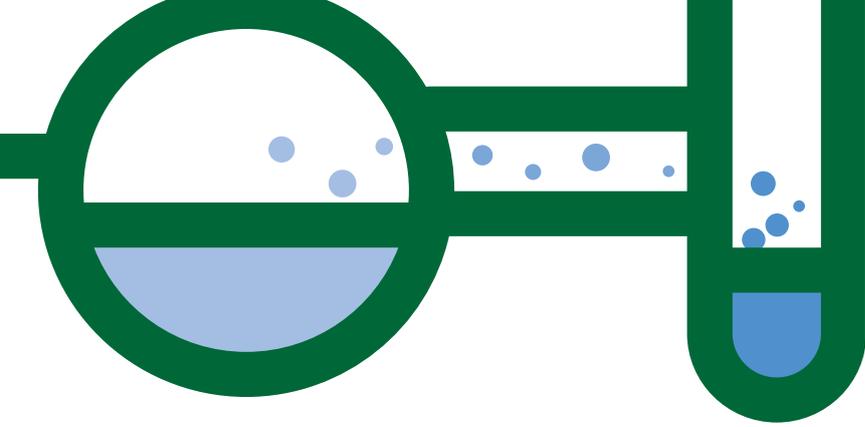
Since 2000, PISA has been conducted every three years; most recently in 2009 when around 400 000 students from 57 countries were involved. In Australia a nationally representative sample of around 14 000 students from 353 schools took part. Australia has now taken part in all four cycles of PISA.

PISA assesses reading, mathematical and scientific literacy with one of these the main focus of the assessments in each cycle. In 2009 the majority of the assessment was devoted to reading literacy with mathematical literacy and scientific literacy assessed to a lesser extent. Reading literacy was also the main assessment domain in 2000. The repeat of reading literacy as the main assessment domain allows us to make comparisons in reading performance over the last decade.

Australia's performance in PISA 2009

Australia's performance in reading literacy on PISA 2009 indicated a drop in standards over the previous decade. Australian students scored an average of 515 points on the 2009 reading assessments, compared to the OECD average of 493 points. However, Australia's overall performance declined by 13 score points from 2000 to 2009. The decline was primarily among higher achieving students and was more evident in some Australian states than others. Australia was the only high-performing country to show a significant decline in reading literacy performance over that period of time.

Australian students also performed less well on mathematical literacy than they have in the past. In 2009 Australian students achieved an average score on the assessments 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. Australia was one of 10 OECD countries to see



a significant decline in mathematical literacy performance from 2003 to 2009.

The best result for Australia came in scientific literacy where our students' average score of 527 remained unchanged from PISA 2006 and was significantly higher than the OECD average of 501.

How concerned should we be about these results? Firstly, it is important to remember that overall, Australia's performance in PISA remains strong. Our students performed well above the OECD average and were significantly outscored by students in only six countries in reading, 12 countries in mathematics and six in science. The big picture view of Australia's achievement in PISA is largely positive. However, when we break this big picture down into smaller components, some worrying findings emerge.

In an increasingly global economy and workforce, Australian students appear to be losing ground on students from nations they may find themselves competing with for jobs in the future. This is particularly evident at the top end of student achievement. While Australia's reading literacy achievement declined significantly between 2000 and 2009, 10 OECD countries recorded significantly improved reading results over the same period.

One of the reasons for Australia's overall decline in performance 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 10 per cent of Australian students in mathematics and science performing at about the same level as the top 30 to 40 per cent of students in countries such as Singapore and Chinese Taipei. The latest PISA report includes newcomer Shanghai. In Shanghai, 50 per cent of students performed at the same mathematical literacy levels as the top 16 per cent of Australian students.

Achievement gaps

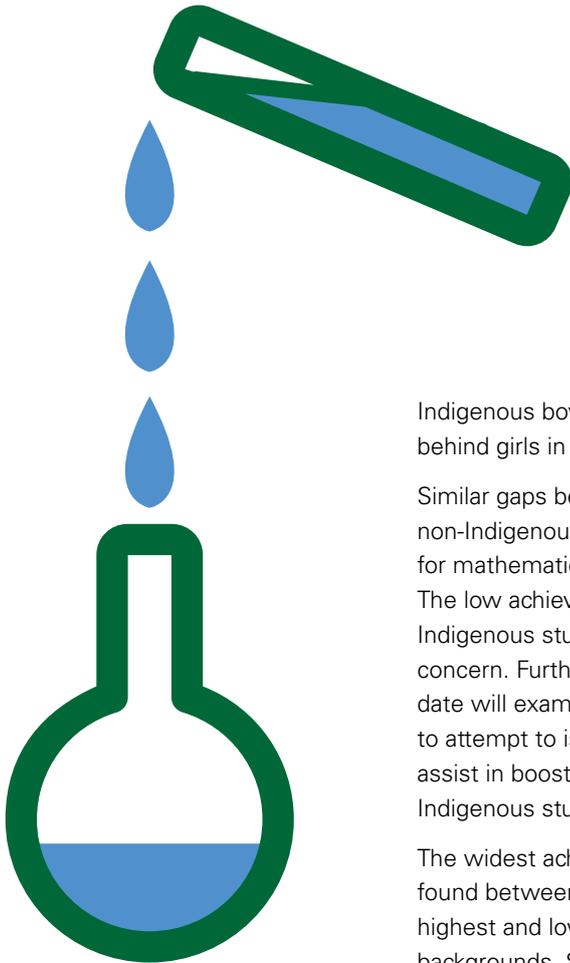
While the primary focus of PISA is on reading, mathematical and scientific literacy, a great deal of background information is also collected from students and schools. This helps us to analyse the influence on achievement of student background including gender, geographic location and socioeconomic status. When we use this information to help take a closer look at how Australian students compare with each other we can clearly see some alarming gaps in achievement in this country, which can sometimes be the equivalent of several years of schooling.

Results in PISA 2009 suggest that achievement decreases with distance from a major city. For example, students in metropolitan schools scored 521 points on average in reading literacy, which was 24 points higher than students from provincial schools, who in turn outscored students in remote schools. The gap between students in metropolitan and remote schools is equivalent to three-

quarters of a proficiency level or about one-and-a-half years of schooling. In addition, students from remote schools were less likely to achieve in the higher levels of proficiency and more likely to achieve in the lower proficiency levels. In remote schools, 29 per cent of students failed to reach proficiency level 2 (the OECD regards students unable to reach level 2 as being at risk of being unable to fully participate in the modern workforce), compared to 17 per cent in provincial schools and 13 per cent in metropolitan schools.

The gender gap in mathematics, which appeared to have closed over recent decades, has re-emerged with boys again significantly outperforming girls. Significant gender differences in reading literacy, in favour of girls, were found in all PISA 2009 countries. The gender difference in Australia was similar to the OECD average. This shows that gender is still an issue in Australian education. If overall mathematics performance is to improve, then efforts must be made to raise the mathematics achievement of girls. Similar efforts are required to boost boys' interest and achievement in reading.

Considerable achievement gaps remain in Australia between Indigenous and non-Indigenous students. In reading literacy Indigenous students scored on average 82 points lower than non-Indigenous students. This difference is equivalent to more than two years of schooling. Indigenous students were also significantly below the OECD average by 57 points. Indigenous girls performed 47 points higher on average than boys in reading literacy, placing



Indigenous boys more than one year behind girls in reading.

Similar gaps between Indigenous and non-Indigenous students were noted for mathematical and scientific literacy. The low achievement of Australia's Indigenous students continues to be a concern. Further investigation at a later date will examine the data more closely to attempt to isolate factors that could assist in boosting the performance of Indigenous students.

The widest achievement gaps were found between students from the highest and lowest socioeconomic backgrounds. 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. Four per cent of students from the lowest socioeconomic group, compared to 25 per cent of students from the highest group, performed at the higher end of the reading literacy proficiency scale. In contrast, a quarter of students from the lowest socioeconomic group, compared to just five per cent of students in the highest socioeconomic group, were unable to reach proficiency level 2 in reading.

In 2009 PISA examined achievement by school sector for the first time. Scores for students in independent schools were significantly higher than scores for students in Catholic schools, which were in turn significantly higher than scores for students in government schools. However, closer analysis shows that these differences between school sectors are explained by differences in socioeconomic

background, indicating that socioeconomic background matters more to student achievement than the type of school.

Conclusions

Should we be concerned by Australia's above average but declining performance in PISA? Australia has now participated in four cycles of PISA. Throughout these four cycles, Australian students have performed at a level significantly higher than the OECD average in all three assessment areas: reading literacy, mathematical literacy and scientific literacy. It is clear from the latest round of PISA results that while our average performance overall remains strong, some Australian students are not being equipped with the literacy skills they will need to participate fully in life beyond school. Australia faces the urgent challenge of closing the achievement gaps that exist between students from metropolitan and rural Australia, between Indigenous and non-Indigenous students, between students from higher and lower socioeconomic backgrounds and, in some cases, between boys and girls.

To put the widest of these achievement gaps into perspective, some Australian teenagers may be trying to enter the workforce and forge a future for themselves with reading, mathematics and scientific literacy skills equivalent to a Year 7 or 8 education or worse. These achievement gaps place an unacceptable proportion of 15-year-old students at serious risk of being unable to effectively participate in the 21st century workforce and contribute to Australia as productive citizens. That