

Australian Council for Educational Research (ACER)

ACEReSearch

[ACER eNews Archive](#)

[ACER Archives](#)

12-2007

ACER eNews 12 December 2007

ACER

Follow this and additional works at: https://research.acer.edu.au/enews_archive



Part of the [Education Commons](#)

Recommended Citation

ACER, "ACER eNews 12 December 2007" (2007).
https://research.acer.edu.au/enews_archive/66

This Article is brought to you by the ACER Archives at ACEReSearch. It has been accepted for inclusion in ACER eNews Archive by an authorized administrator of ACEReSearch. For more information, please contact repository@acer.edu.au.

Published December 2007

In this issue:

- [A world class education system? Evidence from PISA 2006](#)
- [Australian students perform well in science but many below OECD baseline](#)
- [PISA shows Indigenous students continue to struggle](#)
- [Australian students cool on science](#)
- [Girls fall behind in maths assessment](#)
- [ACER UPDATE](#)
- [Introduction](#)

A world class education system? Evidence from PISA 2006

Does Australia have a world-class education system? If not, what kind of 'education revolution' would be required to achieve one? In this opinion article, ACER chief executive Professor Geoff Masters, examines findings from the OECD Programme for International Student Assessment (PISA) released earlier this month and finds that they shed interesting and timely light on these questions.

PISA assesses the scientific literacy, mathematical literacy and reading literacy skills of 15-year-olds. In 2006, the main focus of the testing was on scientific literacy, with almost 400 000 students being tested worldwide. In Australia, more than 14 000 students were tested in all states and territories and in government, catholic and independent schools.

At one level, it is tempting to conclude from the PISA 2006 results that Australia already has a world-class education system. Only three of the 57 participating countries significantly outperformed Australia in the scientific literacy assessment: Finland, Hong Kong-China and Canada. This was similar to the result in 2003 when four of 41 participating countries significantly outperformed us. A more detailed analysis reveals that some Australian states and territories – particularly the ACT and WA – performed as well, on average, as high-performing Hong Kong-China and Canada.

Published December 2007

Although some students in Australia performed poorly in PISA, by international standards, we do not have an unusually long tail of underachievement. This finding runs counter to some commonly held beliefs. The proportion of students in Australia falling below the 'baseline' set by the OECD is not different from the proportion in similarly high-achieving countries. And this is true not only in scientific literacy, but also in mathematical and reading literacy.

Another indicator of the world-class nature of our education system is the observation that the relationship between socioeconomic background and student achievement in Australia is weaker than the OECD average. In the popular jargon, Australia is a 'high quality / high equity' country based on our PISA 2006 performance. And again, this observation is made not only in relation to scientific literacy, but also for mathematical and reading literacy.

These are all reasons to celebrate the success of school education in Australia. At 15 years of age, our students are performing well above the OECD average in key areas of learning and are outperformed by students in only a handful of other countries. PISA suggests that we are within striking distance of being best in the world.

Despite Australia's generally high performance, there are features of the most recent PISA results that may be a cause for concern and certainly should not be ignored.

First, there was a significant decline in the mathematical literacy skills of Australian girls between 2003 and 2006. PISA adds to some emerging evidence that gains made by girls in Australia over recent decades may now be dissipating. In PISA 2000 and PISA 2003, Australian girls performed at the same level as boys in mathematical literacy; in PISA 2006, girls were significantly outperformed by boys.

Published December 2007

Second, there was a significant decline in the average reading scores of both boys and girls between 2003 and 2006. This decline was due mainly to a decline in the proportion of Australian students performing at high levels of reading in 2006. PISA draws no conclusion about the possible causes of this decline, although in some countries, including the United States, declines in teenage reading levels are being attributed to a reduction in the amount of extended reading that students now do. Nevertheless, in other countries, including Korea and Hong-Kong, average reading levels increased during the same period.

Finally, PISA 2006 draws attention to, and underlines, some well-understood challenges that we face in Australia. A first challenge is to reduce the number of students who are falling by the wayside in our schools. Many students become disenchanted, disengaged, fall further behind each year and leave school with unacceptably low levels of the basics. The OECD estimates that 13 per cent of Australian 15-year-olds are performing below the OECD 'baseline' and are at risk of not having the basics required for work and productive citizenship as adults. Australia is not unusual in this regard (the OECD average is 19 per cent), but this remains a serious concern and challenge to Australian schools.

Worryingly, the percentage of 'at risk' students is much higher for some sections of the Australian population. Approximately 40 per cent of Indigenous students, 27 per cent of students living in remote parts of Australia and 23 per cent of students from the lowest socioeconomic quartile are considered by the OECD to be 'at risk'.

The challenge we face as a nation is to ensure that every student, regardless of their background or where they live, has access to high quality teaching and high quality resources. To achieve this, we may need to increase incentives for our best teachers to work in our most challenging schools.

Published December 2007

A second challenge highlighted by PISA 2006 is the challenge of attracting more young people to study mathematics and science. Although Australia is one of the highest performers in scientific literacy, our students have one of the lowest levels of interest in learning science. More than half of Australian 15-year-olds say they have little or no interest in learning about physics, chemistry or biology. Levels of interest in science are particularly low in Queensland. By international standards, Australian students also have relatively low opinions of the usefulness of science. For example, in Tasmania, Victoria and Queensland, three in ten students do not agree with the statement 'science helps me to understand things around me'. It is little wonder that so few students now choose to study advanced science and mathematics in the senior years of school and at university.

The challenge we face as a nation is to improve the quality of mathematics and science teaching in our schools: to find ways to engage students and to help them appreciate the relevance and importance of mathematics and science to life in the 21st century. To achieve this, we may have to rethink our current curricula and find innovative ways to attract highly able young people to the teaching of these subjects.

PISA 2006 provides the most recent and most detailed picture we have of the scientific, mathematical and reading literacy achievements of Australian 15-year-olds. There is much more we could learn from its findings. In many respects, Australia already has a world-class education system, but PISA reminds us that we face significant challenges in ensuring that every young Australian benefits from a world-class education.

Geoff N Masters

Published December 2007

Australian students perform well in science but many below OECD baseline

A global study involving more than 400 000 15-year-olds in 57 countries provides the latest report card on Australia's progress in providing a world-class education system.

Results from the OECD Programme for International Student Assessment (PISA) 2006 show that, while the scientific literacy levels of Australian 15-year-olds are significantly above the OECD average, and either similar to or higher than most of our trading partners, many students in this country continue to struggle.

The average performance of Australian students in scientific literacy was significantly below the average of only three other countries – Finland, Hong Kong-China and Canada – with Australia achieving similar results to students in countries such as Japan and Korea.

However, 13% of Australian 15-year-olds fell below a scientific literacy 'baseline' set by the OECD. While this is clearly of some concern, it is below the OECD average of 19% and similar to the proportion in other similar countries such as New Zealand and Canada. Students performing below this level globally are considered by the OECD to be at serious risk of not being adequately prepared to participate in the 21st century workforce or to contribute as productive future citizens.

Of particular concern is the fact that in scientific literacy, 40% of Australia's Indigenous students, 27% of students in our remote schools and 23% of students from the lowest socioeconomic quartile in Australia performed below the OECD baseline.

Commenting on the Australian results, Professor Geoff Masters, CEO of the Australian Council for Educational Research (ACER), said that, while Australia's overall performance was very pleasing, there were clearly areas of concern.

Published December 2007

“The challenge we face is to ensure that every Australian student has access to high quality teaching and high quality resources, regardless of their background or the school they attend. The task is to ensure that every child has access to, and benefits from, best educational practice”.

Australia’s result in mathematical literacy also was well above the OECD average. There was no significant decline in Australian students’ overall mathematical literacy performances between 2003 and 2006, although there was a significant decline in the average performances of Australian girls during this time.

In 2006, eight countries significantly outperformed Australia in mathematical literacy, compared with seven in 2003. In reading literacy, Australia’s average performance declined between 2003 and 2006, primarily because of a decline in our percentage of high performing students.

In 2006, Australia was significantly outperformed by five countries: Korea, Finland, Hong-Kong, China, Canada and New Zealand. In 2000, only Finland outscored Australia. Average performance levels in some countries, including Korea and Hong Kong-China, increased over this period.

PISA assesses the reading, mathematical and scientific literacy skills of 15-year-olds every three years. The main focus of the assessment is different on each occasion: 2000 (Reading Literacy), 2003 (Mathematical Literacy), 2006 (Scientific Literacy).

In Australia, 356 schools and 14,170 students participated in PISA. The testing occurred during a six-week period from late July to early September in 2006.

The international report *Science Competencies for Tomorrow’s World* was released by the OECD. Information on and is available from www.oecd.org.

The Australian report *Exploring Scientific Literacy: How Australia measures up* by Sue Thomson and Lisa De Bortoli is available from www.acer.edu.au/ozpisa

Published December 2007

PISA shows Indigenous students continue to struggle

The latest results from the OECD Programme for International Student Assessment (PISA) show a continuing wide gap in academic achievement between Australia's Indigenous and non Indigenous students with very little improvement since PISA was first conducted in 2000.

The results from PISA 2006 were released on 4 December by the OECD with an Australian national report released simultaneously by ACER.

Altogether, 1080 Indigenous students were assessed in PISA 2006 as part of an Australian sample of just over 14 000 students. They undertook assessments in scientific, mathematical and reading literacy in mid 2006.

While some Indigenous students performed very well in the assessments, Indigenous students, on average, scored 86 points lower than non-Indigenous students – corresponding to about two and a half years of formal schooling.

Indigenous students were under-represented among the highest scoring students and over-represented among low scoring students. In scientific literacy, 40% of Indigenous students performed below the OECD 'baseline' and were judged to be at serious risk of not being able to participate adequately in the 21st century workforce or to contribute as productive future citizens. In mathematical literacy and reading literacy, the corresponding percentages were 39% and 38%.

These findings mirror the large gaps previously found in both PISA 2000 and 2003 and suggest there has been little improvement over time.

Commenting on the performances of Indigenous students, ACER's chief executive Professor Geoff Masters observed that Australia faced an enormous task in closing the gap between Indigenous and non-Indigenous achievement levels:

"The challenge is to ensure that all Indigenous children, particularly those in rural and remote Australia, are participating and engaged in schooling. And we require incentives to encourage our best teachers to take up our most difficult challenge."

Published December 2007

Australia's results from PISA 2006 are reported in *Exploring Scientific Literacy: How Australia measures up* by Sue Thomson and Lisa De Bortoli. The report is available from the ACER [PISA national website.](#)

A subsequent report to be prepared by ACER will further investigate the performance of Indigenous students.

Published December 2007

Australian students cool on science

Australian 15-year-olds are less interested in science and less concerned about environmental issues than students from other OECD countries according to new research. The OECD Programme for International Student Assessment (PISA) 2006 was released on 4 December by the OECD with an Australian national report released simultaneously by ACER.

PISA assesses the reading, mathematics and scientific literacy of 15-year-old students on a three year cycle. PISA 2006 was the third cycle of testing with science literacy being the main focus. Internationally more than 400,000 15-year-old students in 57 countries spanning the globe participated in PISA 2006. In Australia more than 14 000 students representing 356 schools across all states and territories and school sectors took part.

In each PISA cycle students complete a questionnaire about their background, their attitudes and their beliefs, as well as questions on their engagement and motivation. In PISA 2006, the questionnaire focused on students' attitudes to science, including the environment.

Most Australian students (60%) agreed that advances in science and technology usually help to improve the economy and to improve people's living conditions and that science is valuable to society. The majority of Australian students also agreed that science is important in helping them to understand the natural world.

However, little more than half indicated that science is very relevant to them while fewer than half were happy doing science problems and reading about science.

A large majority of Australian students (92%) considered water shortages a serious concern for themselves and/or others in the country. Over 80 per cent of students reported air pollution, the clearing of forests for other land use, extinction of plants and animals and energy shortages as serious concerns. Three-quarters of Australian students considered nuclear waste to be a serious concern.

Published December 2007

Despite their high levels of concern, Australian students were less concerned about these environmental issues than students from other countries and also felt lower levels of responsibility for sustainable development than the OECD average.

“Australia is going to need highly skilled scientists in the future to tackle problems like global warming and water and energy shortages,” said ACER chief executive Professor Geoff Masters. “These results show that while Australian students recognise the importance of science and are concerned about environmental issues, they don’t seem very motivated to become the future scientists required to alleviate these problems.”

Australia’s results from PISA 2006 are reported in *Exploring Scientific Literacy: How Australia measures up* by Sue Thomson and Lisa De Bortoli of the Australian Council for Educational Research. The report is available from the ACER [PISA national website](#).

Published December 2007

Girls fall behind in maths assessment

Gender is re-emerging as an educational issue in Australia based on the latest findings from the OECD Programme for International Student Assessment (PISA) released on 4 December.

Results from the Australian national report prepared by ACER have revealed some worrying trends along gender lines.

A significant decline in the mathematical achievement of Australian girls has been recorded since the previous cycle of assessment in 2003.

In science, there was no significant difference in average scores achieved by girls and boys overall. However, there were differences within particular content areas and competencies.

On average, Australian boys significantly outscored girls in areas involving physics and chemistry while girls outscored boys in areas of biological science.

"These gender differences are rather disappointing given the considerable efforts made in the 1970s and 1980s to encourage girls to study non-traditional disciplines such as chemistry and physics," said ACER's chief executive Professor Geoff Masters.

He noted that a number of the gaps that had emerged in this cycle of testing were not there previously.

Across the OECD, on average, boys outperformed girls on science by a small but significant margin.

PISA assesses the reading, mathematical and scientific literacy skills of 15-year-olds every three years. The main focus of the assessment is different on each occasion: 2000 (Reading Literacy), 2003 (Mathematical Literacy), 2006 (Scientific Literacy).

In Australia, 356 schools and 14 170 students participated in PISA. The testing occurred during a six-week period from late July to early September in 2006.

Published December 2007

The international report *Science Competencies for Tomorrow's World* was released by the OECD in Paris this evening Australian time and is available from www.oecd.org.

The Australian report *Exploring Scientific Literacy: How Australia measures up* by Sue Thomson and Lisa De Bortoli is available from the [PISA national website](#).

Published December 2007

ACER UPDATE

PISA 2006 Fact Sheets

ACER has prepared a series of seven fact sheets exploring various issues raised by the Australian results in PISA 2006. The fact sheets address these topics:

1. What is PISA?
2. What does PISA test?
3. International rankings
4. Have standards changed?
5. State/territory performances
6. At risk students
7. High quality/High equity

Each of the fact sheets can be downloaded from the [PISA news webpage](#)

PISA reports

The Australian national PISA report, *Exploring Scientific Literacy: How Australia measures up* by Sue Thomson and Lisa De Bortoli, is currently available as a PDF file via the ACER website. Print copies will be available in January 2008. The full report and a summary report, PISA in brief from Australia's perspective, can be downloaded from the [ACER website](#).

The international PISA report, *Science competencies for tomorrow's world*, was released by the OECD on 4 December. There are two volumes to the study covering analysis and data. The OECD media release and information on how to purchase a copy of the international report, is available on the [OECD website](#)

Published December 2007

PISA 2006 and ACER in the news

The release of the Australian PISA results generated much interest in the Australian media. The attached media coverage summary (PDF) includes some of the newspaper articles and radio and television reports that have covered the study. The focus is on media coverage that included commentary from ACER from the release of the report until Friday 14 December.

PISA 2009

ACER has again been selected by the OECD to conduct the major international components of the [Programme for International Student Assessment \(PISA\) for 2009](#). This will be the fourth cycle of the PISA study. ACER will also develop a computer-delivered assessment. ACER will lead an international consortium of research and educational institutions and eminent individuals to deliver the International PISA project. The testing will take place during 2009 with publication of the results due in late 2010. ACER will also act as National Project Manager for the Australian component of PISA 2009.

Introduction

PISA 2006 special edition

This final edition of ACER eNews for 2007 focuses on the release of the OECD Programme for International Student Assessment (PISA) results for the 2006 cycle of testing, released on 4 December.

Published December 2007

Copyright © Australian Council for Educational Research 2015

All rights reserved. Except under the conditions described in the Copyright Act 1968 of Australia and subsequent amendments, no part of this electronic publication may be reproduced, stored in retrieval system or transmitted in any form or by any means, electronic, mechanical, photocopying or otherwise, without written permission. Please address any requests to reproduce information to communications@acer.edu.au

[Subscribe](#)

Australian Council for Educational Research
Private Bag 55, Camberwell, Victoria Australia 3124
Tel: + 61 3 9277 5555
Fax: + 61 3 9277 5500
Web: www.acer.edu.au

