ISSUEANALYSIS

Keeping PISA in Perspective: Why Australian Education Policy Should Not Be Driven by International Test Results

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- The Program for International Student Assessment (PISA) and the Trends in International Maths and Science Study (TIMSS) are driving education policy in Australia.
- The implication of analyses of international assessments that compare school systems is that Australia could achieve equivalent performance levels if it adopted the policies of more successful countries. This is questionable. Data from international assessments can justifiably be used to show strengths and weaknesses in education systems but offer little information about how to improve student performance.
- The top-ranking PISA and TIMSS countries are often very different to Australia socially, culturally, demographically, geographically and linguistically. These features influence educational policy and performance. Student performance in PISA and TIMSS must be viewed in this context.
- The Asian 'tiger' economies have made important educational reforms in the last decade; however, the influence of cultural factors cannot be discounted. Students in high-performing territories such as Shanghai, Hong Kong and Singapore are subjected to punishing study schedules that Australian families would consider excessive.
- Finland is the country most often proclaimed as a model for Australia. However, non-school factors are also likely to play a part in the Finnish results: Finnish society is highly equitable, and this is reflected in its schools; there is low immigration in Finland and fewer Finnish students take the PISA tests in their non-native language; and education, especially reading, is an endemic part of Finnish culture. In addition, Finnish is one of the easiest languages to learn to read.
- The theory that language complexity plays a role in PISA results is gaining credence. Again, taking Finland as an example, English and Finnish are at opposite ends of the spectrum of language complexity. Finnish has a simple orthography, non-complex syllabic structure, and a regular morphology. Relatively few children struggle to learn to read in the early years of school.

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- Performance in the PISA tests depends heavily on reading ability. The PISA maths test is more highly correlated with the PISA reading test than with the maths test in the Trends in International Maths and Science Study (TIMSS), suggesting that reading ability is a better predictor of PISA maths scores than maths knowledge. Some researchers argue this language advantage is irreducible.
- It is important that Australia does not sacrifice the valuable aspects of its unique educational system in the pursuit of an unattainable goal.

Introduction

Since 2000, the Organisation for Economic Co-operation and Development (OECD) has conducted every three years an international assessment of reading, mathematical and scientific literacy called the Program for International Student Assessment (PISA). Such is the level of competitive interest, anticipation and analysis generated with each new report that PISA has become the educational equivalent of the World Cup. According to Prime Minister Julia Gillard, a prime test of Australia's educational quality is to be among the top five countries in the PISA league tables. This goal is included in the Australian Education Bill 2012 introduced in Parliament in November 2012.

The countries currently sitting at the top of the PISA world rankings, with the highest mean scores in reading, mathematical and scientific literacy, are subject to an enormous amount of probing by aspiring countries hoping to find out what distinguishes them from the rest of the world. An in-depth report by the Grattan Institute on the successes of four of the top five territories—Hong Kong, Shanghai, South Korea and Singapore—found that the success of the East Asian 'tiger' countries in PISA is likely to be connected to reforms that have developed the capacity of teachers.[1]

The other top performing country is Finland. The Finnish success story is now well known all over the world: Finland posts the best PISA results in the world by pursuing equity in education. Finland has achieved these twin goals by creating an elite teaching corps, establishing a uniform system of public schools, and expanding the provision of special education.

Another international assessment, the Trends in International Maths and Science Study (TIMSS), is conducted every four years. Several countries have excelled in the most recent rounds of the PISA and TIMSS assessments—South Korea, Hong Kong, Singapore, Japan and Finland. Yet there are important differences between the PISA 2009 and TIMSS 2011 rankings of countries that participated in both assessments. Some English-speaking countries performed better in TIMSS than in PISA. For example, the United States ranked ninth in TIMSS 2011 maths and twenty-ninth in PISA 2009 maths.

The implication of analyses that focus purely on characteristics of school systems is that Australia could also reach the 'high quality, high equity' promised land by adopting the same approach. Given the social, cultural, demographic and geographic differences between these countries and Australia, such a conclusion is highly questionable.

This report has two purposes. First, it investigates whether PISA and TIMSS are appropriate yardsticks to measure Australia's educational standards, and therefore, whether a high PISA or TIMSS rank represents a suitable goal for a nation's education system. Second, it explains the limitations of international assessments for policy development. PISA and TIMSS can justifiably be used to show that Australia must do better in some respects, but they cannot demonstrate how.

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Should we be preoccupied with PISA and TIMSS?

PISA is a point-in-time test of 15-year-olds in school. It assesses how well students are able to use reading, maths and science skills to solve problems framed in the context of everyday situations. The maths and science knowledge required to successfully answer PISA questions is generally not deep or complex; rather, the questions test the application of skills.[2]

According to Geoff Masters, CEO of the Australian Council for Educational Research, which heads the international PISA consortium, the PISA tests are 'sound, reliable instruments that measure accurately what they were designed to measure.'[3] This is not in doubt. What must be considered, rather, is whether

what PISA is designed to measure is a sufficiently broad or rigorous benchmark for academic performance to form the basis of policy.

TIMSS, unlike PISA, assesses the extent of students' knowledge of the factual and procedural content of maths and science curricula.[4] Margaret Wu, a research fellow at Victoria University, describes performance in mathematical literacy in PISA as reflecting 'everyday use of mathematics, which may or may not be learnt in schools, while [the] TIMSS achievement score reflects more school mathematics.'[5]

Mark Schneider of the American Institutes for Research argues that although PISA provides interesting and informative data for comparing the performance of countries, it has limited value as a guide for education policy.[6] As well as the relatively narrow scope of the abilities being measured, PISA results cannot demonstrate strong associations between policy and performance. For example, education policy and conditions at the time of the test are related to student performance only temporally and by correlation.

Indeed, the PISA 2006 report acknowledges these limitations:

> If a country's scale scores in reading, scientific or mathematical literacy are significantly higher than those in another country it cannot automatically be inferred that the schools or particular parts of the education system in the first country are more effective than those in the second. However, one can legitimately conclude that the cumulative impact of learning experiences in the first country, starting in early childhood and up to the age of 15 and embracing experiences both in school and at home, have resulted in higher outcomes in the literacy domains that PISA measures.[7]

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Many OECD countries participate in both PISA and TIMSS, but the international rankings are often quite different. Several high-performing Asian countries continue to do well in both assessments, justifying our interest in their education systems, but the United States and United Kingdom, which rank poorly in PISA, also perform strongly in TIMSS, and do better than Australia. Chinese Taipei's results were also better in TIMSS than PISA.

Table 1: PISA 2009 and TIMSS 2011 rankings[8]

	PISA 2009 reading	PISA 2009 maths	PISA 2009 science	TIMSS 2011 Year 8 maths	TIMSS 2011 Year 8 science
Shanghai-China	1	1	1	*	*
South Korea	2	4	6	1	3
Finland	3	6	2	8	5
Hong Kong-China	4	3	3	4	8
Singapore	5	2	4	2	1
Canada	6	10	8	*	*
New Zealand	7	13	7	16	15
Japan	8	9	5	5	4
Australia	9	15	10	12	12
Netherlands	10	11	11	*	*
Chinese Taipei	23	5	12	3	2
United States	17	29	19	9	10
England	25	26	14	10	9

* Did not participate

This table illustrates the variation in the strengths and weaknesses in performance by the same country on different measures. Finland provides an example of the need to avoid placing too much emphasis on the results of a single assessment. In the PISA 2009 mathematical literacy assessment, Finland was among the top tier of countries, significantly outperformed only by Shanghai, Singapore and Hong Kong, all of which are city-states. This is somewhat of a contrast to TIMSS 2011 Year 8 maths, in which Finland was among the second tier of countries, with results not significantly different to countries such as Australia, the United States and the United Kingdom.

Due to the language barrier, the domestic debate in Finland on mathematics performance is not well known outside the country. In a series of articles in the online mathematics journal *Matematiikkalehti Solmu*, published by the University of Helsinki, mathematics professors and lecturers expressed serious concerns about the mathematics competence of Finnish school students. One article, signed by more than 200 professors, senior lecturers, and university and polytechnic mathematics teachers, claims that 'the mathematical knowledge of new students has declined dramatically.' This and other articles highlight particular deficiencies in fractions, algebra and geometry—mathematical domains that are not tested in any depth in PISA but which are essential for higher mathematics study.[9] University of Arkansas Education Professor Sandra Stotsky has reported on a petition published by these mathematics academics and teachers in the Finnish newspaper *Helsingin Sanomat* in February 2005, suggesting that Finland's strong performance in PISA's maths assessment is due to its 'compatibility' with curricular reforms emphasising 'everyday maths' and problem-solving.[10] Finland's performance in TIMSS 2011 maths cannot be considered low by any means, but it reflects these concerns.

Is it valid to make inter-country comparisons?

All top five 'countries' in PISA, and many of the best-performing nations in PISA and TIMSS in general, are small nations or city-states. Australia's schools are spread over a landmass 23 times the size of the largest of these territories, Finland.[11] This geographical fact of Australia's school system creates logistical challenges unknown in small jurisdictions. Australia is also much more culturally, ethnically and socioeconomically diverse than the top five PISA countries. Our schools reflect the characteristics of our society as much as they create them.

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A number of people have pointed out the folly of modelling our education system based on OECD data in general and PISA rankings in particular. Andrew Norton, higher education program director at the Grattan Institute, has often warned against 'OECD-itis,' the tendency to judge Australia's policies and performance against OECD averages, whether valid or not.[12] Geoff Sharrock, tertiary education program director at the University of Melbourne, points out the risks of specious comparisons between OECD countries when 'it is clear that many countries are exceptional, working in local categories that don't fit neatly into international ones.' There is little to be gained from trying to match the statistics from 'some tiny Nordic monoculture, famed for its surplus of civic virtue, social cohesion and crime fiction,' he says.[13] Similarly, Sue Thomson, coordinator of PISA at the Australian Council for Educational Research, acknowledges 'issues of comparability' between Australia and OECD 'partner economies' such as Shanghai, in which 'the full range of schooling alternatives is not necessarily present.'[14]

Stephen Dinham, chair of teacher education and director of learning and teaching at the University of Melbourne, describes the government's top five PISA target as 'arbitrary.'[15] Dinham and former OECD economist Henry Ergas argue that cultural and economic forces in the top-ranking Asian territories cannot be discounted as factors in their performance in PISA, and which can equally be applied to TIMSS.[16] A cultural obsession with educational achievement, and high payoffs

in income for educational attainment, has created conditions that include a study schedule most Australian families would regard as punishing and excessive, and widespread use of private tutoring outside of school hours. Students are subjected to extremely competitive and demanding examinations, and often have very large class sizes.[17] These features are generally considered unpalatable to education reformers in Australia, and so, although there has been significant interest in the policies and educational activities of the high-ranked Asian tiger countries, they have not been widely advocated as favourable models for Australia.

Similarly, it has been suggested that Finnish culture is a factor in their educational outcomes, especially in literacy. Reading has a high social value and is a large part of life. According to Eliane Gautschi, a Finnish special education expert:

> Finland has long, dark, cold winters, which have spawned a distinct culture of reading that hardly exists anywhere else. At the beginning of the 20th century, Finland had, at 3.8%, the lowest rate of illiteracy in the world. Today, reading still has a high social value. Even during primary school, reading groups outside of school are important, and library visits are a favorite pastime.

Gautschi also explains that because few television programs are made in Finnish, and they are sub-titled rather than dubbed, watching television is another form of reading practice.[18]

It is highly problematic to draw inferences between any one feature of a country's education system and its success or otherwise in international assessments. Each country's circumstances are unique, and the performance of its students will be influenced by a large number of factors, within the school system and outside it. Influential non-school factors include the prevalence of poverty, immigration levels, and language complexity.

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Similar arguments could be mounted against adopting any other country's education system as a model for Australia, but Finland's school system is the example most often invoked in discussions of education policy in Australia.[19] Pasi Sahlberg is a Finnish education expert cited frequently in Australia and other English-speaking countries. In the past several months, he has been travelling the world, telling and selling the Finnish success story to thousands of educators, policymakers and academics, and the general public.[20] His interpretation of the Finnish education system echoes that of the OECD, and together, theirs has become the standard version.

Sahlberg and the OECD point to five major factors that have positively contributed to Finland's education achievement.

1. A common and unified public school system with a national curriculum. There are very few private schools and there is no school choice until the end of compulsory schooling, which covers grades 1 to 9
2. An elite and highly educated teacher workforce
3. A high degree of autonomy and professional trust for teachers with no external examinations until the end of schooling
4. Early and continual provision of special education for struggling students and students with disabilities
5. A strong welfare state, including universal access to child care and health services.

Is it reasonable to suggest that Australia could adopt any or all of these educational reforms, and if so, could we expect the same results?

Leaving aside questions about the appropriateness of PISA and TIMSS performance benchmarks, there are good reasons to doubt Australia could ever mimic Finland. There are profound differences between Australia and Finland that determine educational policy and outcomes.

The question of equity

All countries have a socioeconomic gradient in student performance to a greater or lesser extent. Finland is highly regarded because it is not just a high-performing country; it is also a high equity country. This means the achievement gap associated with socioeconomic status in Finland is one of the smallest among OECD countries. In contrast, Australia's socioeconomic equity gradient is larger and much closer to the OECD average.

According to Sahlberg, the common public school system and the lack of choice of school in the compulsory years of education in Finland are key contributors to its socioeconomic equity in outcomes. Provision of special education is a key element in lifting the performance of struggling students and students with disabilities. In 2009, more than 8% of students were classified as having special educational needs, and 6% were permanently in special education classes, either full time or part time.[21] Almost one-third of all students received some sort of special educational intervention.[22]

While there is little doubt early and ongoing intervention for students with special educational needs is a highly effective strategy, the notion that the structure of the school system can be credited with Finland's high socioeconomic equity in outcomes requires further investigation. Without suggesting that the common school system played no part, other contributing factors should be considered.

Inequities in schools reflect society at least to some extent. Finland and Australia have markedly different socioeconomic profiles. Economic equality is higher in Finland, child poverty is lower, and parental education is higher.

Finland has the largest gender gap in reading literacy of all OECD countries participating in PISA, with girls significantly outperforming boys.

Table 2: Socioeconomic statistics of Finland and Australia

Gini coefficient[23]	Finland	0.26 (Rank 8)
	Australia	0.34 (Rank 26)
	OECD average	0.31
Child poverty[24]	Finland	5.3%
	Australia	10.9%
Parent educational attainment[25]	Finland	Low 11% / Medium 42% / High 46%
	Australia	Low 48% / Medium 25% / High 27%

These differences, while not indicating cause and effect, show that Australia's and Finland's education systems have very different challenges. It is fair to expect that schools and school systems not exacerbate socioeconomic differences, and reasonable to aspire to reduce them, but it is unrealistic to hold schools responsible for completely ameliorating social inequities. Children in Finland come to school with much smaller differences in abilities and less extreme differences in family backgrounds than Australian students. The task for Australian teachers is as a result much more difficult.

While Finnish students have relatively small socioeconomic gaps in their performance on PISA, the same cannot be said for gender and ethnic equality. Finland has the largest gender gap in reading literacy of all OECD countries participating in PISA, with girls significantly outperforming boys. The mean reading score for girls was 55 points higher than for boys—the equivalent of more than a year's worth of progress. The reading gender gap in Australia was 36 points, slightly less but not significantly different to the OECD average of 39 points. Finland's gender gap in scientific literacy was again the largest in the OECD but not as large as in reading, while Australia's was negligible. In both countries, the gender gap in mathematical literacy was small, both favouring boys.

Australia is one of the few countries in which students from immigrant backgrounds (students whose parents are foreign-born) perform significantly

better in PISA than non-immigrant students. In Finland, students from immigrant backgrounds perform significantly worse. This is an important statistical feature of the Finnish results.

Only 2.6% of Finnish students are the children of immigrants, and a large proportion of those are from neighbouring Sweden.[26] Swedish-born Finns typically have a similar socioeconomic profile as native Finns, so the immigrant population is small and unlikely to influence the country's average results. This is a very different scenario to Australia, where 19.3% of students are from immigrant backgrounds.[27] On average, second-generation immigrant families have a slightly higher socioeconomic status than the population average but the significant proportion from humanitarian programs, who are twice as likely to be of school age than the total migrant population, are very socioeconomically disadvantaged.[28] Unlike in Finland, where Swedish-speaking students can complete the PISA test in their native Swedish, all Australian students are required to complete the PISA in English whether or not it is their native language. Despite these relative disadvantages, the Australian education system allows these students to achieve strong results.

Starting salaries and maximum teaching salaries in Finland are lower than in Australia.

Teaching in Finland

Finland's approach to teacher recruitment and education has likely played an integral role in the country's educational outcomes. Entry to teacher education degrees at university is highly competitive—teacher education students are drawn from the top 10% of candidates. In addition, teachers must complete a master's degree in education as well as a bachelor's degree. This has created a highly competent and a highly educated teaching workforce. Teachers are also well trained in identifying and working with students with special educational needs.[29]

It is interesting to note, however, that the attraction to teaching is not high salaries. According to OECD data obtained by converting salaries to US dollars and adjusting for Purchasing Power Parity, teachers in Finland earn slightly lower salaries than Australian teachers, on average, at all levels of schooling. Starting salaries and maximum teaching salaries in Finland are lower than in Australia.[30] In terms of relative wages, where teacher salaries are expressed as a ratio of average earnings of full-time tertiary educated people, the two countries are also similar—0.92 for Australia and 0.89–1.10 for Finland. Upper secondary teacher salaries are at the higher end of the scale.[31]

More important, it seems, are the working conditions of teachers. The impression created by books and documentaries on Finland's schools is that students are almost all well behaved, self-motivated, and responsible.[32] Discipline and student welfare intervention on the scale required in Australian schools appears to be almost non-existent in Finland. Teachers can focus entirely on teaching and learning, making optimal use of their face-to-face class time. Teachers' work hours (total work time and classroom teaching time) are lower in Finland than in almost any other country and substantially lower than in Australia. Finnish primary teachers spend an average of 680 hours in the classroom in a year out of a total work time of 794 hours. Australian primary school teachers spend on average 868 hours in the classroom each year out of a total 1,093 hours.[33] The national averages are similar in terms of the ratio of classroom hours to total hours—0.86 in Finland and 0.80 in Australia. For the reasons mentioned above, this data should be interpreted with caution, but they do suggest Australian teachers have a larger workload.

Some aspects of Finland's approach to improving the calibre of teacher education candidates have been debated in Australia, particularly the idea of setting high university entry scores and expanding the criteria for teacher education courses.[34] The quality of teacher education has been the subject of dozens of reviews over the past several decades, with consistent findings that preparation for teachers is inadequate in many courses, especially the nature and quantity of practical experience

and the mentoring of new teachers.[35] A number of universities are moving from one-year post-graduate diplomas to two-year master's degrees for teaching.[36] Strategies to increase both the quality of teaching candidates and the pre-service education they receive remain areas of potential positive reform. Successfully attracting high quality candidates to teaching depends at least in part, however, on the appeal of teaching as a career. Creating Finland's teaching conditions in Australia would be a difficult task because of the different natures of the societies and the different challenges they present.

The language advantage

An often overlooked but arguably important difference between Finland and English-speaking countries is language. Student performance in PISA assessments is heavily dependent on the level of reading literacy. Completing even the easier questions in the mathematical literacy and scientific literacy tests requires students to have a reasonably high level of reading ability. Mean country scores on these two tests are highly correlated with scores on the PISA reading literacy test. In fact, in an analysis of data from PISA 2003 and TIMSS 2003 (Year 8), Margaret Wu found a stronger correlation between PISA reading score and PISA maths score ($r = 0.95$) than between TIMSS maths and PISA maths ($r = 0.84$).[37] In other words, reading ability was a better predictor of performance on the PISA maths assessment than maths knowledge (as measured by TIMSS).

An example from Level 1 (lowest level of difficulty) of the PISA mathematical literacy test:

> *Mei-Ling from Singapore was preparing to go to South Africa for three months as an exchange student. She needed to change some Singapore dollars (SGD) into South African rand (ZAR). Mei-Ling found out that the exchange rate between Singapore dollars and South African rand was: 1 SGD = 4.2 ZAR. Mei-Ling changed 3000 Singapore dollars into South African rand at this exchange rate. How much money in South African rand did Mei-Ling get?*[38]

Completing even the easier questions in the mathematical literacy and scientific literacy tests requires students to have a reasonably high level of reading ability.

An example from Level 1 (lowest level of difficulty) of the PISA scientific literacy test:

> Students had to read a passage that began with the following paragraph and answer questions about it.
>
> *A team of British scientists is developing 'intelligent' clothes that will give disabled children the power of 'speech.' Children wearing waistcoats made of a unique electrotextile, linked to a speech synthesiser, will be able to make themselves understood simply by tapping on the touch-sensitive material. The material is made up of normal cloth and an ingenious mesh of carbon-impregnated fibres that can conduct electricity …*[39]

It is clear from the above examples that reading literacy is a prerequisite to answer even the easiest mathematical and scientific questions.

The relationship between reading literacy and TIMSS has not been examined extensively. As TIMSS questions tend to be less 'wordy' than PISA maths and science questions, it might be expected that the influence of reading ability would not be as strong. Some evidence, from the TIMSS 2011 Year 4 cohort, suggests that this assumption may be incorrect. In 2011, TIMSS coincided with another international assessment, the Progress in International Reading Literacy Study (PIRLS). PIRLS assesses reading literacy among Year 4 students. Thirty-seven countries participated in both TIMSS and PIRLS. The results of these studies were

published only a few days before this report was completed, so a student-level data analysis has not been possible. At the country level, there are high correlations between mean performance on the three assessments: PIRLS-TIMSS Year 4 maths r = 0.90; PIRLS-TIMSS Year 4 science r = 0.97; and TIMSS Year 4 maths-TIMSS Year 4 science r = 0.94. The magnitude of these correlations indicates that reading literacy is a strong predictor of performance on the TIMSS maths and science assessments, particularly so for science. This does not mean they are causally related, but it does demonstrate that it is rare for a country to do well on the TIMSS maths and science measures if it is a country of poor readers.[40] One interpretation of this result is that even though the TIMSS assessments require less reading than PISA, reading ability is still an important element in understanding and responding to questions. Another interpretation is that in countries where reading is mastered earlier and more successfully, there is more time to spend on teaching the maths and science curricula in primary school.[41]

Why might the relationship between reading ability and performance in international assessments be significant in country comparisons if students complete the test in their own language? First, it is not clear that assessments translated into different languages measure exactly the same aspect of student ability, particularly tests presenting 'everyday' scenarios where cultural and linguistic differences may be factors. Second, some languages are easier to learn than others. If a language is easier to learn, fewer students will struggle with reading, thus affecting a country's average performance in tests that require a reasonably high level of literacy.

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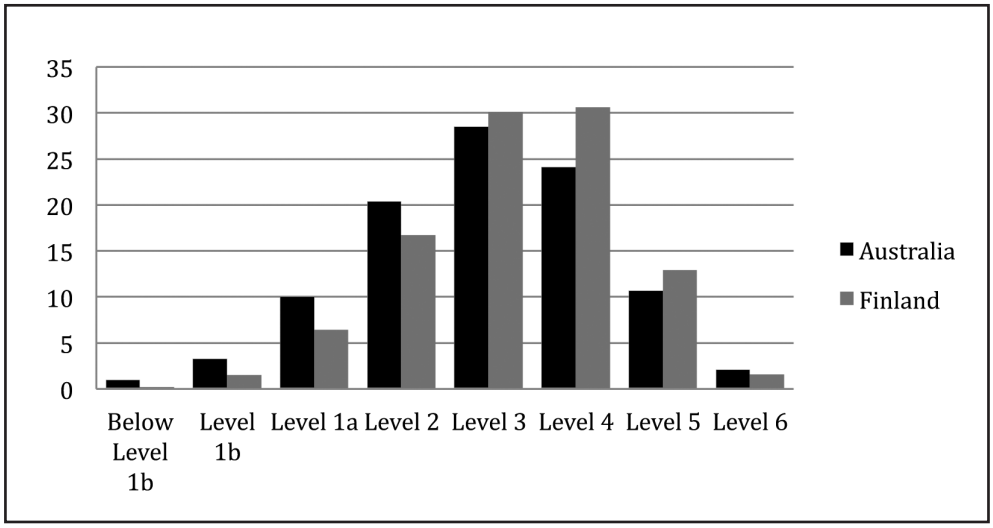
Figure 1 shows that the proportion of Australian students and Finnish students in the top two proficiency levels on the PISA reading scale is not very different. In fact, at the highest level, there are proportionally more Australian students (2.1%) than Finnish (1.6%). The largest differences between the two countries are at the lower end of the proficiency scale. When the lowest three levels are combined into a single category (Level 1 or below)—13.4% of Australian students are in this group compared to 8.1% Finnish students. The differences were greatest at the very bottom. One in 100 Australian students failed to reach even the lowest benchmarked level, compared to one in 500 Finnish students.

Figure 1: Percentage of students at each proficiency level on the reading scale, PISA 2009



Source: OECD, PISA 2009: *What Students Know and Can Do: Student Performance in Reading, Mathematics and Science* (Paris: OECD, 2010), Annex B.1

Languages based on the same alphabet may still vary in their complexity. Again using Finland as an example, the Finnish and English languages are at the extremes of the range of language complexity. Finnish has a 'shallow' orthography—each letter is represented by a single sound, with a relatively small number of letter blends that make unique sounds. Letter-sound relationships are highly consistent. English has a 'deep' orthography—single letters can have more than one sound, and vice versa, and there are a large number of letter-blends that make unique sounds. English has numerous inconsistencies in letter-sound relationships because of its mixed origins.[42] English also has a complex syllabic structure—a higher frequency of syllables containing multiple consonants—while Finnish has a simple syllabic structure.[43]

The relative simplicity of the written language in Finnish allows more rapid acquisition of the decoding skills required for accurate and fluent reading.[44] One-third of Finnish children can already read simple text when they begin school, and one study found that three-quarters of children could accurately read sentences at the end of their first year at school.[45]

English readers need at least two and a half years to master familiar word recognition and decoding skills that other language readers achieve within their first year of school.

Researchers Philip Seymour, Mikko Aro, and Jane Erskine compared reading acquisition among Scottish children and children in non-English speaking countries, including Finland, in their first year of school. They found that competence in foundation reading skills developed more slowly in languages with deep orthographies. Reading acquisition was much slower in English than in any of the European languages. This was true for Scottish children from both high and low socioeconomic backgrounds, but especially so for the low SES children. The findings show that English readers need at least two and a half years to master familiar word recognition and decoding skills that other language readers achieve within their first year of school. Going further, Seymour, Aro and Erskine argue that language complexity is fundamental to success in learning to read, and that even under the most optimal education conditions, there will be 'irreducible differences in rates of progress between learning to read in English or other deep orthographies and learning to read in shallow orthographies.'[46]

Another feature of the Finnish language, one that has been less studied, is a more logical and consistent morphology. The morphology of a word can convey its meaning through the meaning of its root words components. Compositional words have two morphemes, for example, 'cowboy.' Derivational words have a morpheme plus a prefix or suffix, for example, 'happiness.' Readers can often work out the meaning of unfamiliar words using their knowledge of morphology. This is more difficult in languages such as English with root words from multiple origins than in languages such as Finnish with fewer and more regular root words.[47]

Compare the word 'pentagon' in the two languages. In Finnish, the word is *viisikulmio*, composed of two Finnish words—*viisi* = five and *kulma* = angle. In English, the word is composed of two Greek words—*penta* = five and *gonia* = angle. This is just one instance of many, and it shows how Finnish readers, even if they have not seen the word pentagon before, would have a good idea of the meaning.[48] A more regular and consistent morphology assists in vocabulary development, which in turn, makes comprehension easier. A complicating factor is the complex grammar in Finnish; however, cognitive scientist Philip Seymour says this presents more of a problem for foreigners learning to speak Finnish than for children learning to read.[49]

Although numerous studies show that reading skills develop at different rates in different orthographies,[50] there is less research examining how specifically this relates to differences between countries in international assessments. As such, the theory advanced in this report—that performance in international assessments is at least in part a function of language complexity—is speculative. However, it is no less plausible, and has no less evidence to support it, than theories relating to school system variables.

Conclusion

Australia is not the only country suffering from what has been called 'PISA envy.'[51] Partly as a result of the Western world's fascination with country comparisons, and its preoccupation with educational standards, and partly because of a historical lack of data on educational outcomes, the detailed results of international assessments hold much interest. Due to its strong performance, Finland has become a popular destination for 'educational tourism,' and hundreds of articles have been written about the educational reforms and policies of this tiny Nordic country.[52]

The danger is that the freedom and diversity in education Australian families enjoy might be sacrificed for an unachievable goal.

There is nothing wrong with perusing educational data to better understand the level and range of Australian students' abilities in reading, maths and science. Nor is there anything wrong with wanting to know how well Australian students stack up against their counterparts in other countries. These are positive endeavours and allow necessary scrutiny of strengths and weaknesses in our curriculum, policies and practices.

Yet it is problematic to judge the quality of a diverse and challenging education system against a single assessment, no matter how good it may be. PISA and TIMSS are well-designed and well-implemented tests, and provide robust data on the skills and knowledge they are designed to capture. However, there is much that PISA does not assess. It is geared toward 'everyday' problem-solving and does not test the depth of student knowledge in the key areas of maths and science. Both PISA and TIMSS seem to depend heavily on reading ability.

It is also problematic to set goals based on comparisons or rankings. If all OECD countries improved their education system significantly, they would improve outcomes for students but there would be no change in the rankings. In addition, inter-country comparisons are often invalid. A country like Australia cannot be meaningfully compared to city-states and nations whose geography, history and culture are so strikingly disparate.

Finland in particular has been proclaimed as an example of how educational reforms that run counter to the path of our own policy agenda have created high quality and high equity in outcomes. The widely accepted influential factors are the universal public school system, national curriculum, and lack of external testing and accountability. These are not the only possible variables at play, though. Finland's socioeconomic equity is likely to be a reflection of a highly equitable society, and there is good reason to believe, and some evidence to support, the theory that superior PISA results are contingent on the difficulty of the language of assessment. It is also the case that very different conditions in the Asian tiger economies have produced similarly high results.

The danger of failing to put in context the performance of other countries is that we fail to recognise our strengths and take for granted the features of our education system that are integral to Australia's cultural and historical conditions. The danger is that the freedom and diversity in education Australian families enjoy might be sacrificed for an unachievable goal. The significant common factors in high-performing systems are a high cultural and social status attached to education and a strong focus on teacher preparation and development. Only the latter can be changed through policy. Hopefully, the former will be the eventual consequence.

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