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# Retrieving information, interpreting, reflecting, and then... Using the results of PISA reading literacy

Juliette Mendelovits

Juliette Mendelovits is a Senior Research Fellow at the Australian Council for Educational Research. After graduating with a Master of Arts degree in English Literature, Juliette taught at secondary and tertiary institutions before coming to ACER in 1991. Since then she has worked mainly in literacy and humanities areas, developing assessments for primary and secondary school and university level. Within the Measurement Division of ACER she has led a test development team specialising in outcomes-based assessments. She has directed a number of projects including the development of an award winning English assessment for the Education Department of Western Australia's Monitoring Standards in Education program. Since 1998 Juliette has been engaged in work for the reading literacy component of the OECD's Program for International Student Assessment (PISA) project. She played a leading role in the development of the reading literacy instrument for PISA 2000 and is one of the authors of the PISA 2000 thematic report on reading, to be published by the OECD (in press). She is project director for ACER's International Schools' Assessment.

When the initial report on PISA 2000 (OECD 2001) was released in December last year there was hardly a ripple in the Australian press. Jan Lokan, National Project Manager and first author of the Australian PISA report (Lokan et al, 2001)<sup>1</sup> gave a few press conferences and there was an article or two in the national and big-city papers. Immediate public reaction was muted, to say the least. Why should it be anything else? One reason is that Australia did very well in the horse race, in reading literacy coming equal second – along with about seven other countries – surpassed only by Finland. But therein, most likely, lies the reason or at least one of the reasons for the silence – no news is good news.

Contrast this with the furore that has been going on in Germany for the past nine months. Germany performed significantly below the OECD average in all three domains of reading, mathematical and scientific literacy – not the expected result for a nation that prides itself on its 'historically strong education system' (Schmoll, 2002). Maybe I was just lucky, but it seems more than coincidence that on my two brief trips to Europe since last December I should each time, by chance, come across PISA publicity. In early January a newspaper article in the *Frankfurter Allgemeine* (the English version) talked of the cultural rethink necessary for the whole of Germany – not just in education but in family and social life also. Then, in July, I happened to be in Belgium when the Länder – States' – results were released. On late night television, channel surfing, I caught a panel discussion between Andreas Schleicher (the head of PISA at the OECD) and representatives from several States talking about the differentially disappointing results in various parts of the country. One bit I did understand, with my limited German, was a state minister for education's expostulation: 'Yes, that's typically German – the attention is focussed on whether to blame the teachers, or blame the parents but never, "What can we do about this to improve things!"' Another reaction, among Germans I spoke to, was to blame the test: 'How come English-speaking countries did so well?

It's a biased test.' Or to defend the curriculum: 'We Europeans spend so much time learning other languages that we don't have the curriculum time to get our students to acquire the same level of skill in the mother-tongue as monoglot countries.'

There is much to be said about each of these German responses, but my point is mainly to contrast the interest and introspection provoked by PISA in Germany with the silence in Australia – at least the immediate silence. What will, or indeed can, Australia learn from PISA, and how can PISA be used to inform our understanding of and to improve reading literacy?

I want to answer this question with a description of three uses of PISA reading literacy in Australian contexts. The first is a pragmatic use of the PISA results at a national level: *retrieving information* from the international study and using it to define a benchmark for reading literacy for Australian 15-year-olds.

The second is a research-based use of the PISA reading literacy scales: *interpreting* the scales at different levels, downward, to describe reading literacy development on a continuum from Year 3 up to the PISA levels, for 15-year-olds.

The third is *reflecting* on PISA: using what we have learnt about reading literacy to question, evaluate and perhaps modify the way we conceive of, describe and teach reading in Australia.

'Retrieving information', 'interpreting' and 'reflecting' are central terms in the PISA reading literacy lexicon. In the PISA reading framework (OECD, 1999) the construct for the reading assessment instrument was built by defining a number of variables, subdivided into categories. The chief of these variables were 'situation' – the contexts in which people read; 'text format' – the structure of the text; and 'process' – the aspect from which the reader approaches the text. The categories within the last of these – aspects or processes – formed the basis of the reporting scales for reading literacy: retrieving information, interpreting

<sup>1</sup>Participating countries were encouraged to release their reports on the same day the OECD released the international report.

and reflecting. Each of the aspects was represented by a specified number of tasks in the main study reading instrument, and proficiency in reading is described as proficiency in Retrieving information, in Interpreting and in Reflecting, along three separate continua.<sup>2</sup>

My use of the terms ‘retrieving information’, ‘interpreting’ and ‘reflecting’ to identify and differentiate ways of using the PISA reading results is not completely serious: of course, all three processes, or aspects, are at work in all of the suggestions I’ve outlined. But perhaps it could be argued that one of the aspects is salient in each case. There was a similar degree of arbitrariness (although the effort was pretty serious) in categorising tasks for PISA reading. In most tasks all three aspects play some part, but each task had to be identified for reporting purposes as belonging to the retrieving information, interpreting or reflecting aspect.

- Retrieving information is defined as locating one or more pieces of information in a text.
- Interpreting texts is defined as constructing meaning and drawing inferences from one or more parts of a text.
- Reflecting is defined as relating a text to one’s experience, knowledge and ideas.

Each of these three aspects is defined in five levels of proficiency, with Level 1 being the lowest level, and level 5 the highest.

From the outset, PISA rejected the idea of literacy as capacity that is either present or absent: rather it is conceived of as an ‘advancing set of knowledge, skills, and strategies, which individuals build on throughout life’ (OECD, 1999). The five levels described in the PISA reading scales are an attempt to define this advancing proficiency along different aspects of reading. As a corollary, PISA has not attempted, at an international level, to define what is an ‘adequate’ level of literacy, or, conversely, to mark a point at which an individual, a group or a nation is ‘at risk’ because of a particular level of literacy. Nevertheless, in a national context, it is meaningful and arguably essential to define such a point. And so we come to the first of the proposed ways of using the results of PISA reading.

## Retrieving information from the PISA reports to define benchmarks for reading literacy for Australian 15-year-olds

MCEETYA has established benchmarks for ‘minimum acceptable standards’ of reading, writing, spelling and numeracy for Years 3, 5 and 7. It has also, from early on, expressed the intention of setting benchmarks for

an older, mid-secondary level cohort: either Year 9 or Year 10. The decision has now been made by MCEETYA’s Performance Measurement and Reporting Taskforce (PMRT) to use the PISA results as the benchmark, reporting on the age cohort of 15-year-olds, rather than a grade level cohort.

The PISA scales offer a neat way of establishing national benchmarks in reading and numeracy (or, as they are called in PISA, reading literacy and mathematical literacy) for this older age group, without repeating in all its detail the process that has been attached to standard setting for the younger cohorts.

How can this be done? The PMRT first needs to decide whether it is going to adopt a benchmark standard similar to that established for the younger cohorts, that is ‘minimum acceptable standard’. It would be possible to take a different approach, for example, measuring Australian 15-year-olds’ proficiency against the OECD mean. If the former approach were taken, however, the meaning of ‘minimum acceptable standard’ would need to be modified for the 15-year-old cohort. For Years 3, 5 and 7 the benchmark defines the ‘minimum acceptable standard needed to progress satisfactorily through school’. The 15-year-old benchmark definition would need to take account of the different pathways that young adults may follow from 15 years onward, so that ‘minimum acceptable standard needed to progress satisfactorily through school’ for 15-year-olds could become ‘minimum acceptable standard needed for life and learning beyond school’.<sup>3</sup>

The PISA reading literacy scale has been divided into five described levels of proficiency. A key step in setting the benchmark will be to determine, judgmentally, what point on the PISA scale is considered the minimum acceptable standard. This will be a matter of inspecting the descriptions of the scale and the tasks that are located around the point or points in question. Forty-five tasks from PISA 2000 have been released (OECD, 2002). The tasks span the range of levels, aspects and text formats, and are well suited to this purpose. The question to be asked is, ‘Would we expect a student performing at a minimum acceptable standard to be able to perform this task?’ Another way to put the question is, ‘Would you be worried about a student who couldn’t do this task?’ – a process similar to that used to define the benchmarks at Years 3, 5 and 7.

Taking the simplest case, the Benchmark Committee could decide, for example, to consider as possible benchmark locations the cutpoints between Level 2 and Level 3; or between Level 1 and Level 2; or between Below Level 1 and Level 1.

<sup>2</sup>For a detailed description of the development of the described proficiency scales for reading see *PISA 2000 Technical Report* (Adams & Wu, in press), Chapter 16.

<sup>3</sup>The phrase comes from the program for the PISA Symposium on *Assessing Policy Lessons from PISA 2000* (Berlin, November 2002).

What would these levels look like substantively? Here are the descriptions for the three levels in question:

|   | Retrieving information  | Interpreting   | Reflecting  |
|---|---|--|---|
| 3 | Locate, and in some cases recognise, the relationship between pieces of information, each of which may need to meet multiple criteria. Deal with prominent competing information. | Integrate several parts of a text in order to identify a main idea, understand a relationship or construe the meaning of a word or phrase. Compare, contrast or categorise taking many criteria into account. Deal with competing information. | Make connections or comparisons, give explanations or evaluate a feature of text. Demonstrate a detailed understanding of the text in relation to familiar, everyday knowledge, or draw on less common knowledge. |
| 2 | Locate one or more pieces of information, each of which may be required to meet multiple criteria. Deal with competing information.   | Identify the main idea in a text, understand relationships, form or apply simple categories, or construe meaning within a limited part of the text when the information is not prominent and low-level inferences are required.                | Make a comparison or connections between the text and outside knowledge, or explain a feature of the text by drawing on personal experience and attitudes.  |
| 1 | Locate one or more independent pieces of explicitly stated information, typically meeting a single criterion, with little or no competing information in the text.                | Recognise the main theme or author's purpose in a text about a familiar topic, when the required information in the text is prominent.   | Make a simple connection between information in the text and common, everyday knowledge.  |

Figure 1 Extract from Reading Literacy Levels Map<sup>4</sup>

A substantive approach to the issue would involve inspecting the PISA descriptions and the reading tasks around the Level cutpoints and determining whether one would confidently expect students at a minimally acceptable level of reading proficiency to be able to perform such tasks.

However, it would be disingenuous to pretend that decisions about benchmarks are made on substantive grounds alone: what level of 'below minimum standard' can be tolerated will also be considered.

So let's take a look at the percentages we're considering here. In Australia (combined reading literacy scale) the results for PISA 2000 on the combined reading literacy scale were:

|                |     |
|----------------|-----|
| Below Level 1: | 4%  |
| Level 1:       | 10% |
| Level 2:       | 19% |
| Level 3:       | 26% |
| Level 4:       | 24% |
| Level 5:       | 18% |

Would it be tolerable to say that 4 per cent of Australian 15-year-olds (the percentage below Level 1) are below minimum acceptable standard, or at risk? Or would it be tolerable to say this of 14 per cent of 15-year-olds (the percentage below Level 2)? Or 33 per cent (the percentage below Level 3)?

Once the Australian benchmark on the PISA scale has been agreed, the next step is the estimation of the number of students above and below each benchmark in each jurisdiction, and by nominated subgroups. As long as Australia participates in PISA internationally, and as long as we sample beyond the PISA minimum national sampling requirement (as we did in 2000),

these results will be available from the national data collection for PISA every three years.

If states and territories wish to report against such a national benchmark annually, at system level, it would be possible to use the released PISA items to constitute a full reading test, which could be administered to samples of students in each constituency every year. There are more than enough items in the released set, representing a balance of the framework, to afford an annual data collection to ascertain percentages of students above and below benchmark at the system level. There is a question about security, however, since the items are in the public domain. Nevertheless, as long as there is no reporting at the individual level, there is unlikely to be much agitation about taking the test, and therefore the danger of practice effects could be minimal.

If states and territories' requirement is to report on benchmark status by assessing whole populations, and to report at the individual level, as it is for Years 3, 5 and 7, then theoretically every 15-year-old could be administered a PISA-item assessment composed entirely of PISA items. This would not be a good option, however, as the pressure to practise with the released items, once individual reporting is in the offing, would no doubt be irresistible. One solution would be to select a set of PISA items to embed into either a national assessment for 15-year-olds, or a state- or territory-level assessment. Each jurisdiction could select from the pool of 45 items the set that they considered best suited for their population, and build the rest of the assessment around it to reflect their particular version of the English curriculum.

<sup>4</sup>This extract is taken from the full Reading Literacy levels map published in various places including *Knowledge and Skills for Life: First Results from PISA 2000* (OECD, 2001).

## Interpreting and extending the PISA reading literacy scales

PISA measures the outcomes of eight to ten years of formal school education. If we are convinced that what PISA measures is worth measuring, then we will want to make sure that what goes on in classrooms during those eight to ten years contributes to strong outcomes on the PISA scales, and we will want to be able to track how things are going well before the end of compulsory schooling.

With such aims in mind, ACER is currently conducting research within an assessment program to develop the PISA scales downwards, so that we will have described proficiency scales in retrieving information, interpreting and reflecting that map student progress from Year 3 onward.

The project in which this work is being conducted is the International Schools' Assessment (ISA), an assessment of Grade 3, 5, 7 and 10 students in reading literacy, mathematical literacy and writing that is using the PISA frameworks for its test construct and will use modified versions of the PISA scales for reporting results. The ISA is being administered for the first time in October 2002. Both the reading literacy and mathematical literacy instruments for the ISA are a combination of tasks from three sources: PISA 2000; the Literacy and Numeracy National Assessment (LANNA), an Australian assessment used by independent schools for reporting benchmarks to the commonwealth; and items developed specifically for the project.

In the case of reading literacy, the items that have been developed and selected at each year level represent, in PISA-specified ratios, two of the three main variables we discussed above – 'aspect' and 'text format'. The mix of multiple choice and constructed response tasks used in PISA reading is also duplicated in the ISA.

By using a substantial number of PISA items in both the Grade 7 and Grade 10 tests, it will be possible to calibrate the new ISA items onto PISA-anchored scales, and from there to define reading proficiency below Level 1 (something we were unable to do with the PISA 15-year-old sample) in terms of the ISA items that populate our downwardly extended scales.

To take an example of how this is being done, let's look at the 'interpreting' scale and at the lowest PISA level of described performance: 'Recognise the main theme or author's purpose in a text about a familiar topic, when the required information in the text is prominent.'

This Level 1 description is simply a summary. In the work that went into describing the scales, four variables were identified that contribute to making an interpreting task more or less difficult: the type of

interpretation (identifying a main idea, understanding a relationship, construing meaning or analogical reasoning); the degree of explicitness of information; the nature and amount of competing information; and the nature of the text.

An example of a Level 1 interpreting item from the PISA released set was based on a magazine article about running shoes and required the reader to recognise the main idea in the article (see Appendix 1).

The main idea was implied in the subheading and repeated several times in the body of the article. In this item, the type of interpretation is the easiest – identifying a main idea. The information is given inexplicitly. There is a little competing information but the repetition of the idea and its prominence (near the beginning of the text) probably compensates for this. Regarding the nature of text, the article is of medium length and has several sections.

An 'interpreting' item from the Grade 3 ISA test was, obviously, less demanding. It asked the reader to identify a main idea in a short text that would be highly familiar to most students: an advertisement for a young children's alphabet cubes game (see Appendix 2).

A very easy task on this text asked students to identify who the game is mainly for: adults, children, teenagers or parents? The information is not given literally but the brevity of the text, the support offered by the illustrations and the very familiar content all combine to make this a particularly easy text to interpret. Finding one of the main ideas – the intended audience of the advertisement – was made relatively easy because there are many hints about the audience: the nature of the game, the children's comments given as testimonials, the ages of the children giving testimonials. There is little distracting information: the word 'family' is used in the text, but it is not one of the alternatives offered in the multiple choice format. Eight-three per cent of Grade 3 students were successful in this task.

By articulating the constituents of each aspect and inspecting the calibrated items, like this one, in the light of those constituents, we will arrive at an empirically based progression of descriptions, with the theoretical framework underpinning it. The lowest 'interpreting' level might, then, look something like: 'Recognise the main theme in a short, simple text about a familiar topic when the required information in the text is prominent and repeated.'

Some preliminary work has been done to map the PISA described proficiency levels onto the Grade 3 to Grade 10 scale using trial test data from international and Australian schools. Figure 2 shows the first pass at this work.

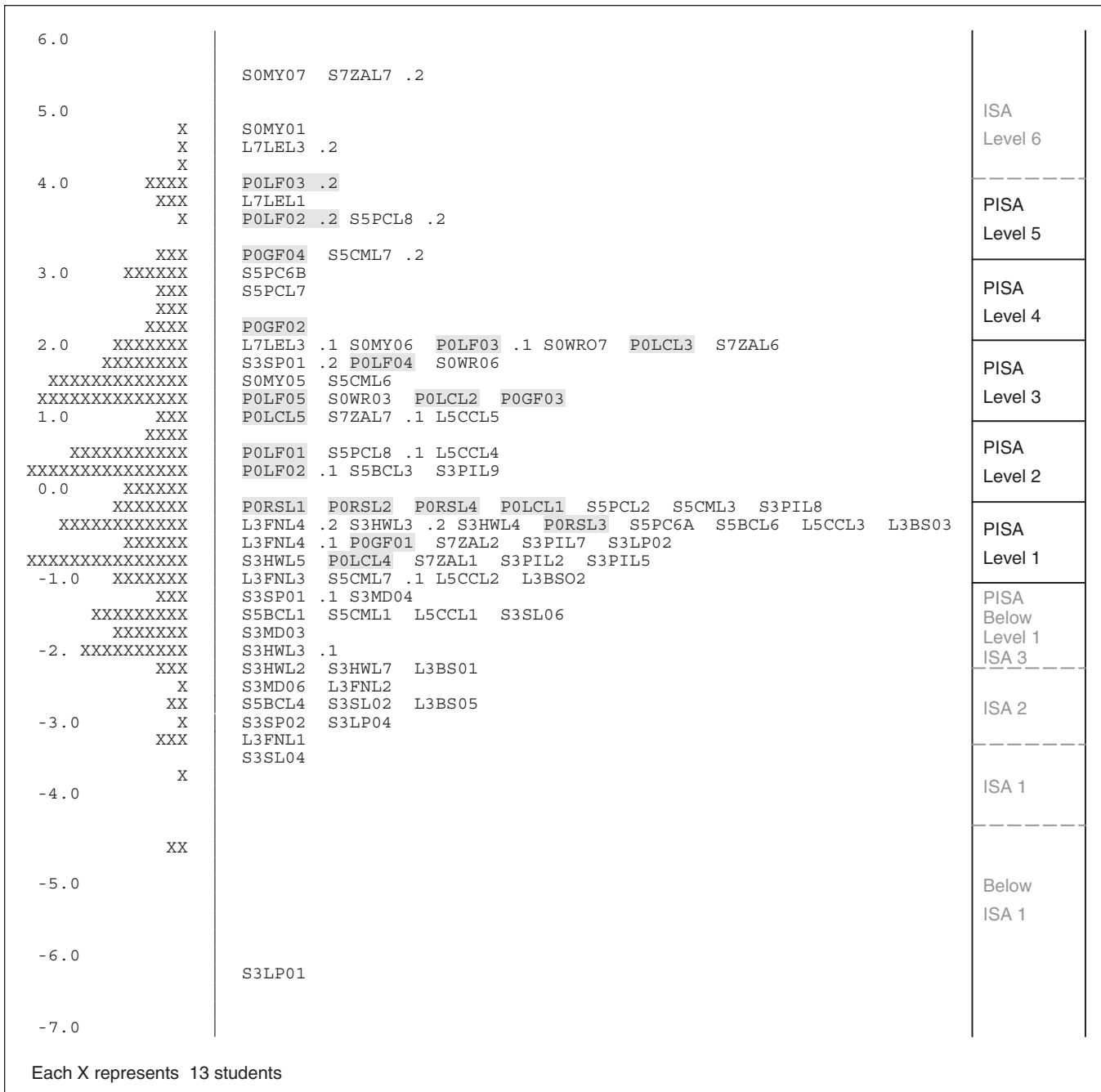


Figure 1 Sketch of extended PISA combined reading literacy scale

The item threshold map is an analysis of trial tested items that are being used in the first administration of the ISA. The items are shown to the right of the axis. Shaded items are those that were selected from the PISA 2000 released reading set and that are being used in the ISA in October 2002. They were also trial tested for the ISA, so we can see their position in relation to the ISA items for Grades 3, 5, 7 and 10. To the far right of the figure is a sketch of where the PISA proficiency levels might sit, based on the PISA items' calibrations. Also sketched are some cutpoints to show where we might place levels below the lowest described PISA level and, possibly, a level above PISA Level 5.

The immediate user group that will get the reports on these scales is international schools. At this early stage of the project's life, schools in around 20 countries, mostly Asia and Europe, are involved. Obviously this group is particularly interested in a reporting framework that is based on PISA's, with its international genesis and international endorsement. Although the assessment is being targetted specifically at international schools, the described scales we are developing should be of significant interest to a much wider audience – we hope, in particular, to Australian audiences.

## Reflecting on the PISA framework and Australian results to inform concepts of reading and pedagogical practices

The third use of PISA results proposed here is a less operational and more diffuse one, although its implications are very practical.

Reading literacy as instantiated in PISA insists that to benefit from and contribute to a modern democratic society people need to be able to do a multiplicity of things with different texts, for different purposes.

‘Texts’ means not just prose, but also charts, graphs, diagrams, advertisements and – in the PISA definition, though not yet in its practice – hypertexts. The multiplicity of things that ‘people need to be able to do’ with texts includes not just comprehension (more or less literal understanding of the text), but also interpreting, extrapolating from, comparing and contrasting, applying texts to one’s own experience and knowledge, and conversely applying one’s own accumulated experience and knowledge to texts. For some purposes, retrieving a single piece of information from a text is what is called for; for other purposes, drawing on a value derived from a deep and rich experience of literature may be needed in order to make a sensible judgment about a particular piece of writing.

The third use of PISA proposed here is to look at the different perspectives from which PISA defines and describes reading literacy, and to use those perspectives, and Australia’s results, to reflect on and perhaps modify the way we conceive of and teach reading in Australia.

As one way of approaching this, we can look at Australia’s performance on the Aspect subscales used by PISA. Figure 3 shows Australia’s mean performance on each subscale compared with the performances of the five other predominantly English-speaking countries that took part in PISA 2000. The figures are given on the PISA scale, for which the OECD mean on the combined reading literacy scale was set at 500 and the standard deviation at 100.

As can be seen here, all the English-speaking countries with the exception of the United States performed well above the OECD average on all three aspects. But digging deeper, how can we use these results to inform the way we conceive of and teach reading in Australia?

|                | Retrieving |       | Interpreting |       | Reflecting |       |
|----------------|------------|-------|--------------|-------|------------|-------|
|                | mean       | s.e.  | mean         | s.e.  | mean       | s.e.  |
| Australia      | 536        | (3.7) | 527          | (3.5) | 526        | (3.5) |
| Canada         | 530        | (1.7) | 532          | (1.6) | 542        | (1.6) |
| Ireland        | 524        | (3.3) | 526          | (3.3) | 533        | (3.1) |
| New Zealand    | 535        | (2.8) | 526          | (2.7) | 529        | (2.9) |
| United Kingdom | 523        | (2.5) | 514          | (2.5) | 539        | (2.5) |
| United States  | 499        | (7.4) | 505          | (7.1) | 507        | (7.1) |
| OECD average   | 498        | (0.7) | 501          | (0.6) | 502        | (0.7) |

Figure 3 Aspect means for English-speaking countries

First, the term ‘teach reading’ bears some reflection. In the early years of school, teachers definitely do, deliberately and explicitly, teach reading. But once students can decode ‘reading’ it is not a separate subject. Instead it is embedded in the learning areas – English, of course, and, ideally, every other learning area for its own purposes. Nevertheless, descriptions of what we mean by reading are not articulated anywhere other than in the English and Languages Other Than English documents. Probably for that reason one of the aspects of reading identified by PISA, ‘retrieving information’, gets a very short run.

Most Australian teachers of English would not have much trouble with the ideas of interpreting and reflecting as being essentials of the readers’ repertoire, and descriptions of processes synonymous with interpreting and reflecting are the staple of the national English frameworks in all their varieties. Retrieving information, on the other hand, is less likely to be recognised as part of the English curriculum beyond the early years of schooling. While Australia performed comparatively well on the ‘retrieving information’ scale, the skills and understandings that are peculiar to retrieving information do not appear in our profiles for reading beyond about Level 4.<sup>5</sup> It would be worthwhile to have a look at those upper levels of the PISA scale describing retrieving information, and at the clusters of items that appear at the top of the retrieving scale to ensure that the understandings about text structures, and conventions and the skills to negotiate complex texts, figure somewhere in our national and system descriptions of what we mean by ‘reading’ and by ‘progress in reading’.

In contrast to the ‘retrieving information’ scale, Australia performed relatively poorly on the ‘reflecting’ scale in comparison with other predominantly English-speaking countries. This despite the fact that, as I mentioned earlier, most Australian teachers of English would not have much trouble with the notion that reflecting is an essential part of the readers’ repertoire.

Lokan et al (ACER, 2000) report that Australia did comparatively poorly on tasks based on narrative texts compared with tasks based on expository texts. Can we put this together with Australian and other English-speaking countries' performance on the reflecting scale to say something about national concepts of reading and teaching methodologies?

One way of approaching this issue – beyond looking at the mean scores for reflecting – is to inspect the results for different selections of items from the reflecting strand. To do this, two kinds of tasks were grouped together: one group of eight tasks that deal with critical evaluation – either linguistic or stylistic issues, or issues of logical consistency; and another group of eight tasks that ask students to draw on personal opinion or personal experience. The items are from a variety of units based on different text types and formats: narrative, expository and argumentative texts in continuous text (prose) format, and tables and diagrams in non-continuous format. The comparison, shown in Figure 4, again focuses on Australia's performance relative to the performances of other predominantly English-speaking countries.

|                          | Critical evaluation<br>(% correct) | Personal response<br>(% correct) |
|--------------------------|------------------------------------|----------------------------------|
| Australia                | 44.3                               | 48.2                             |
| Canada                   | 48.0                               | <b>55.8</b>                      |
| Ireland                  | 43.2                               | 54.1                             |
| New Zealand              | 44.9                               | 51.1                             |
| United Kingdom           | <b>50.1</b>                        | 51.1                             |
| United States            | 40.2                               | 45.5                             |
| English-speaking average | <b>45.1</b>                        | <b>51.0</b>                      |
| OECD average             | 38.2                               | 47.6                             |

Figure 4 Performance of English-speaking countries on selected reflecting items

The most striking result here concerns the UK rather than Australia. Great Britain, which has a strongly literary curriculum for English, does well in comparison with the other English-speaking countries on the critical evaluation items, though only performs at the average level (for English-speaking countries) on the personal response group. Canada also performs comparatively well on critical evaluation and exceptionally well on the personal response group. Australia is below the average for English-speaking countries on both types of reflective item, and almost at the OECD average for personal response items.

One hypothesis to draw from this is that a literature-centred syllabus may develop skills of critical evaluation more successfully than does our more thematic and issues-based approach to English. This may not be of concern but we should at least be aware that that's the trade-off we've made. And the results presented here suggest that in the area of reflection and critical evaluation generally, and not only evaluation confined to literary texts, we could learn something from other English-speaking countries' curriculum approaches.

To go back to my question at the beginning of this paper: What will Australia learn from PISA and how can PISA be used to inform our understanding of and improve reading literacy? I believe there will be changes to the way we think about, measure and teach reading literacy in Australia as a result of PISA. The changes are unlikely to make headline news, but they are likely to have subtle and long-term beneficial effects on the development of reading literacy in Australia.

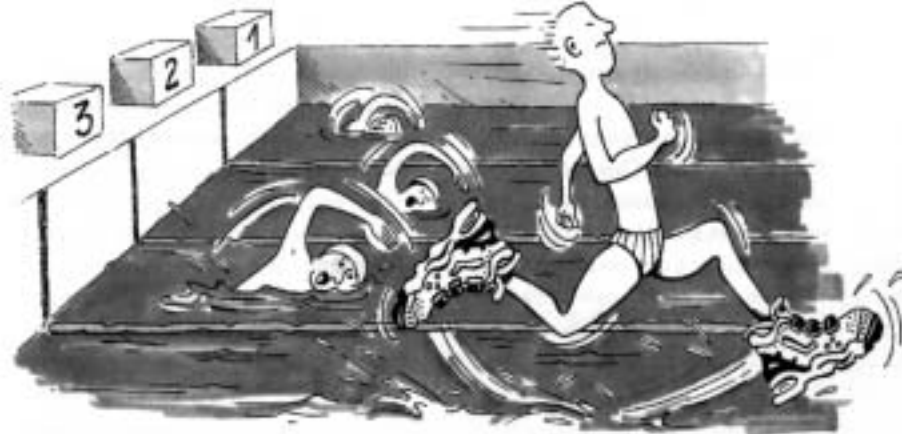
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<sup>5</sup>See in the National Profile for English, for example, Reading and Viewing 4.5 and 4.8b (Curriculum Corporation, 1994). Beyond these outcomes there are no references to skills and knowledge in retrieving information in texts. The lack of description of retrieving information skills in Australia's systemic and national descriptions for Reading in English was drawn to my attention by Jocelyn Cook, Education Department of Western Australia. Her contributions to this and other aspects of this paper are gratefully acknowledged.



**FEEL GOOD IN YOUR RUNNERS**



*For 14 years the Sports Medicine Centre of Lyon (France) has been studying the injuries of young sports players and sports professionals. The study has established that the best course is prevention ... and good shoes.*

**Knocks, falls, wear and tear...**

Eighteen per cent of sports players aged 8 to 12 already have heel injuries. The cartilage of a footballer's ankle does not respond well to shocks, and 25% of professionals have discovered for themselves that it is an especially weak point. The cartilage of the delicate knee joint can also be irreparably damaged and if care is not taken right from childhood (10–12 years of age), this can cause premature osteoarthritis. The hip does not escape damage either and, particularly when tired, players run the risk of fractures as a result of falls or collisions.

According to the study, footballers who have been playing for more than ten years have bony

outgrowths either on the tibia or on the heel. This is what is known as “footballer’s foot”, a deformity caused by shoes with soles and ankle parts that are too flexible.

**Protect, support, stabilise, absorb**

If a shoe is too rigid, it restricts movement. If it is too flexible, it increases the risk of injuries and sprains. A good sports shoe should meet four criteria:

Firstly, it must *provide exterior protection*: resisting knocks from the ball or another player, coping with unevenness in the ground, and keeping the foot warm and dry even when it is freezing cold and raining.

It must *support the foot*, and in particular the ankle joint, to avoid sprains, swelling and other problems,

which may even affect the knee.

It must also provide players with good *stability* so that they do not slip on a wet ground or skid on a surface that is too dry.

Finally, it must *absorb shocks*, especially those suffered by volleyball and basketball players who are constantly jumping.

**Dry feet**

To avoid minor but painful conditions such as blisters or even splits or athlete’s foot (fungal infections), the shoe must allow evaporation of perspiration and must prevent outside dampness from getting in. The ideal material for this is leather, which can be water-proofed to prevent the shoe from getting soaked the first time it rains.



# KRAZY KUBES

We play every day after school. I can't wait to get home to play.

Joh, age 7

Krazy Kubes are the best!

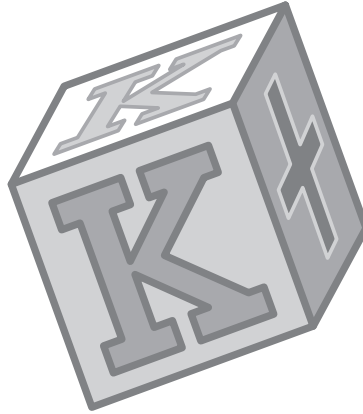
Sally, age 8

Krazy Kubes are a great new game for all the family.



Our teacher lets us play Krazy Kubes and sometimes she even plays too.

Elise, age 9



You can build, you can read, you can add, and most of all, you can have...

FUN FUN FUN!



Laugh and learn with Krazy Kubes