

MAKING THE GRADE

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As a school student, I awaited the arrival of the end of year report with a bracing mix of hope and fear.

Now, as Australia's Chief Scientist, I'm worried once again about school reports.

Our proudly first-class country, with a prosperous economy and an egalitarian spirit, must not be fair-to-middling when it comes to science and maths in schools. On the evidence before me, we are.

Do I believe that international testing can capture everything of importance in Australian education? No.

But do I take these findings seriously? Yes, I do.

Be it the international studies PISA and TIMSS, or the national scheme NAPLAN, the message is clear.

Our performance in absolute terms is stalling, or in decline; and our position in global rankings continues to fall.

Canada now scores significantly higher across all PISA and Year 8 TIMSS domains. England has improved its TIMSS performance, whilst also decreasing the proportion of low-performing students.

Australia, by contrast, is one of only three countries with significantly decreased maths and science scores in this round of PISA. And the difference between children in Australia's highest and lowest socioeconomic quartiles recorded by PISA is the equivalent of three full years of school.

Whilst we demand to be top ten in sport, we are barely scraping top *twenty* in schools. In PISA maths, we have fallen as low as twenty-five. How much lower are we prepared to go?

My concern is not the temporary wound to national pride. It is the enduring harm we do when students leave school with malnourished potential – or worse, no interest at all – in disciplines that they require to navigate their world. We need to improve.

Let's start by defining the aim: the best possible education in maths and science (and literacy) for every child, irrespective of gender, region, income or incoming ability. In the twenty-first century, we can no more write a child off because "he's not into numbers" any more than we would accept that "she's not that keen on the alphabet".

Maths is not just the language of science and technology, but the foundation of commerce, the core of engineering, and the bread and butter of every trade from cooking to construction.

How can we hold governments to account, if journalists can't interpret data, and citizens can't make sense of charts?

How can we resist the prophets of the post-truth world?

When everything we value is at stake, surely nothing less than our utmost will do.

So with that aim in mind, let's agree to share the task: yes, we do bear individual responsibility; but no, we cannot lay the blame solely on individuals, be they principals, teachers, parents or students.

There is no point in exhorting individuals to aim high unless we help them to make the leap. If we want excellence, we have to provide a system with the incentives, enablers and rewards for improvement built in.

For me, that comes down to a new three R's for education.

Restore meaningful maths prerequisites for all university courses that, no-one could argue, need numbers. It would reverse the exodus from advanced maths courses and set students up for success – in commerce and accounting, as well as science and engineering. Just as importantly, it would give principals a reason to make the quality of their maths programs a priority all the way from kindergarten to Year 12.

Respect teaching. The single most important factor in the classroom is the human up the front. The education system must be engineered around that fundamental premise, so that high-achieving students become highly-qualified teachers with well-targeted professional development.

Crucially, teacher training and development needs a strong discipline-specific focus. It should be expected that our science and maths teachers are experts in their fields, with both the technical and pedagogical knowledge to teach them well. The Commonwealth Science Council strongly endorsed this principle at its last meeting in September, and requested the Department of Education to investigate options to bring it about.

Recognise the influence of school leaders. Principals set the tone in their schools, and with the right strategic focus, they can drive a culture of constant improvement. Without that senior leadership, it is simply too hard for individual teachers to keep the bar consistently high – another reality the Commonwealth Science Council has acknowledged.

Of course, ambitious aims have investment pathways attached. But money spent is not a proxy for effort invested, and it is certainly not a reliable predictor of success. As a businessman, I learned that no project delivers what you want unless the *how* comes before the *how much*.

Face the hard truths, aim high, be strategic – and we might just receive a school report we can be proud to display.