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## OPINION

# More testing is not the answer to declining international maths results

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Mathematics is a language that helps us to understand our world. From engineering to actuarial studies and advancements in medicine, mathematics helps us to communicate, to problem solve and to investigate our earth. It is a beautiful language that is mostly taught in isolation, where connections with real life are often contrived and difficult for students to see, but if they can become fluent in mathematics, many doors are opened to them.

The release of the 2018 PISA results and the further decline in mathematics achievement in Australia suggests these doors are remaining closed to increasing numbers of Australian students. The results demand we ask tough questions about why this is happening.



Australian 15-year-olds are falling behind, according to the latest international assessment.

All teachers are doing their best. They desperately want to help their students to achieve and will often go above-and-beyond to support them. However, there are several issues facing mathematics education that need attention.

First, society needs to change its attitude towards mathematics, and this starts with governments recognising the importance of mathematics and the sciences to Australia's future. The government needs to invest in the future by providing more funding for teacher education in all primary and high school sectors, university and TAFE, and more funding for professional associations to provide high quality professional development for teachers across all sectors, especially in regional NSW.

In my research into primary undergraduate teachers' attitudes towards mathematics, between 27 per cent and 30 per cent reported they had dropped maths by the end of year 10 and had forgotten the basic mathematics they had learned at school. They lacked confidence in their own abilities to do mathematics. The Literacy and Numeracy Test in Initial Teacher Education, or LANTITE, was introduced to address this. Unless undergraduates in NSW pass this test before their final prac they cannot become classroom teachers. While the test has provided the impetus for many preservice primary teachers to improve their mathematics, it has done little to change their attitudes. The influence of teachers' attitudes on their teaching has an impact on student learning. Some primary students will disengage from mathematics as early as year four and teacher's attitudes have a bearing on that.

A student's early experience has a flow-on effect to their beliefs and attitudes as they progress through high school. Sadly, there is a double whammy awaiting some of them. The recent study by the Australian Mathematical Sciences Institute, *Crunching the Numbers of Out-of-Field Teaching (2018)*, found that 76 per cent of students will be taught by a teacher not trained to teach mathematics for at least one year in their first four years of high school. If the students coming into high school have missed out on the fundamentals in primary school, even with all the best intentions, out-of-field teachers will often struggle to fill these gaps.

The syllabus across all years are filled with "dot points" or concepts that teachers feel they have to teach. These syllabuses are prescriptive and tell teachers "what" they must teach, but not "how" to teach it. Add to this the pressure on schools to perform in NAPLAN and HSC, with rankings being presented publicly. As a result, NAPLAN, which was designed to inform teachers and schools about individual student's progress, has now become high stakes with children engaging in preparation for the test outside of school.

Students, parents and school value correct answers and most children measure themselves by the

number of crosses on a test. Sadly, this focus on achievement loses sight of the beauty of mathematics. The need to check off the dot points mean that many schools teach the formulae and the processes required to do well in the test. However, real mathematics is posing questions, problem solving and investigating. It is highly engaging and contextualised. The consequences of our current system is that students see themselves as "doing maths" in class, but they do not see themselves as mathematicians.

High quality teachers and teaching practices will improve student outcomes. Investing in education and teacher professional development is incredibly important. Introducing more testing for students will only result in a further decline in the PISA results.

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