



Foreword

PISA has long established that disadvantaged students tend to trail behind their privileged peers in their mathematics achievement – even if the achievement gap varies widely across countries. But that left open the question: to what extent can teachers and schools do something about this?

The PISA report, *Equations and Inequalities: Making Mathematics Accessible to All*, sheds light on this. While education systems have generally done well in providing equitable access to the *quantity* of mathematics education – in the sense that disadvantaged students spend about the same time in mathematics classes in school as their advantaged peers – the data show large differences in the *quality* of learning experiences between social groups. These inequalities result in a waste of talent.

While disadvantaged students tend to learn simple facts and figures and are exposed to simple applied mathematics problems, their privileged counterparts experience mathematics instruction that help them think like a mathematician, develop deep conceptual understanding and advanced mathematical reasoning skills.

These differences matter, because greater exposure to pure mathematics tasks and concepts has a strong relationship with higher performance in PISA, and the data suggest that exposing all students to challenging problems and conceptual knowledge in mathematics classes can have a large impact on performance. In addition, the relationship between the content covered during mathematics instruction at school and the socio-economic profile of students and schools is stronger in countries that track students early into different study programmes, that have larger percentages of students in selective schools, and that transfer less-able students to other schools.

On the one hand, the findings from this report are disappointing, in the sense that they show that mathematics education often reinforces, rather than moderates, inequalities in education. On the other hand, they show that high-quality mathematics education, and thus education policy and practice, are an essential part of the solution to redressing social inequality. Policy makers can develop more ambitious and coherent mathematics standards that cover core mathematical ideas in depth, increase connections between topics and align instructional systems with these standards. They can also reduce tracking and stratification and/or moderate their effects. Teachers can help students acquire higher-order mathematics knowledge and skills by replacing routine tasks with challenging open problems, support positive attitudes towards



mathematics, provide students with multiple opportunities to learn key concepts at different levels of difficulty, and offer tailored support to struggling students. Parents' expectations and attitudes towards mathematics matter too. And we can all do much better in monitoring and analysing not just students' learning outcomes, but students' opportunity to learn.

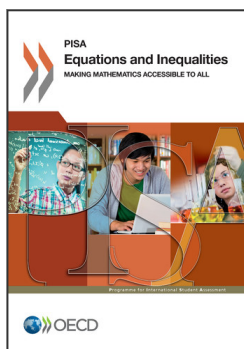
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