

Strengths-based approach by teachers the key to boosting students' mathematical identity and countering deficit thinking – expert

Focusing on strengths in students' mathematics work rather than their "weaknesses, shortcomings, and failures" was vital for effective teaching and learning of the subject, according to ACU researcher Dr Thorsten Scheiner.

Dr Scheiner, of ACU's Institute for Learning Sciences and Teacher Education (ILSTE), said encouraging teachers to use a strengths-based approach when assessing students' mathematics work would help to overcome a traditional culture of deficit thinking.

"This deficit thinking can have a devastating impact on our students' mathematical identity," Dr Scheiner, who has conducted a research project training pre-service teachers on how to use a strengths-based approach, said.

"One in two secondary students in Australia, especially girls and marginalised students, do not enjoy or are not confident in mathematics, putting them at risk of falling behind on the path to higher education or entry into the workforce."

Dr Scheiner designed a teacher education program to support Masters' students specialising in secondary mathematics teaching to critically reflect on how they understood, noticed, and responded to students' mathematical thinking based on samples of student written work.

Participants did professional reading, learned about how their framing of students' mathematical thinking was socially, culturally, and historically conditioned, and explored different ways to consider student thinking to recognise and respond to their strengths.

Of the nine pre-service teachers involved in the study, seven, or 78%, initially demonstrated deficit-based approaches by focusing primarily on students' misconceptions, flaws, and errors.

However, by the end of the program, all participants had shifted to using strengths-based language and framing including providing positive reinforcement and praise, as well as recognising students' mathematical thinking as being a valuable resource to build upon.

Dr Scheiner said this did not mean they ignored students' mistakes or problems with reasoning, but rather addressed them in a way that acknowledged their strengths.

"Deficit-based framing creates an environment where students are seen as lacking and needing to be fixed, rather than as capable of achieving success in mathematics," he said.

"Strength-based framing is an alternative to deficit-based framing, as it values students' thinking. It is explicitly necessary to reduce the stigmatisation of ability and combat the narrative of negativity, inadequacy, and failure in learning mathematics."

Dr Scheiner said while the study, published in *Educational Studies in Mathematics*, was conducted in Germany, the results were transferable to mathematics teaching and learning globally.

Further research by ILSTE will examine what mathematics teachers notice about students' work and how they respond to it in-the-moment, rather than with the benefit of time to reflect on students' written work as per Dr Scheiner's study.

Link to the research: <https://doi.org/10.1007/s10649-023-10235-y>

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