

## Enabling Students' Critical Mathematical Thinking

Vince Geiger

*Australian Catholic University*  
vincent.geiger@acu.edu.au

Kim Beswick

*University of New South Wales*  
k.beswick@unsw.edu.au

Jill Fielding

*University of New England*  
jill.fielding@une.edu.au

Thorsten Scheiner

*Australian Catholic University*  
thorsten.scheiner@acu.edu.au

Gabriele Kaiser

*University of Hamburg*  
gabriele.kaiser@uni-hamburg.de

Merrilyn Goos

*University of the Sunshine Coast*  
mgoos@usc.edu.au

The capacity to use mathematics *critically* is essential for making decisions and forming judgements about challenges facing society including those related to the economy, health and the environment (Geiger et al., 2020). Critical Mathematical Thinking (CMT) involves the use of mathematical techniques and reasoning to address complex real-world problems in a wide range of contexts. The capacity to reflect on the consequences of proposed solutions to real-world problems (e.g., social, ethical) is a key dimension of CMT because of potential impacts on individuals and society at large (Maass et al., 2019). People who are unable to apply CMT in real-world contexts have fewer opportunities for both employment and participation in society (D'Ambrosio & D'Ambrosio, 2013). Developing students' CMT, however, is difficult and there is little evidence that current curriculum and pedagogical responses to this challenge have been effective, which indicates that CMT teaching and learning practices are under researched and theorised.

In this session, we outline a project that aims to generate new insight into teaching practices that can promote or inhibit students' CMT development. This requires attention to what teachers *see* when students work on CMT tasks and how they respond to what they *see* — a complex process described by Sherin et al. (2011) as *teacher noticing*. Student success has also been linked to teachers' beliefs about student capability (Beswick, 2018).

The research team will work with five schools from metropolitan and non-metropolitan areas using an innovative video-based methodology that integrates researcher and teacher perspectives on students' CMT development. The goal of this approach is to support teachers in learning to notice students' CMT within classroom settings. Planned outcomes of the project include new theoretical and practical knowledge as well as resources designed to promote teaching and learning practices that support students' CMT development.

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