



Szeged, Hungary, August 3-7, 2016

MATHEMATICS  
EDUCATION

*How to solve it?*



**PROCEEDINGS  
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Editors

Csaba Csíkos

Attila Rausch

Judit Szitányi



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# UNDERSTANDING THE EMERGING COMPLEXITY OF PROFESSIONAL DEVELOPMENT

Theodosia Prodromou<sup>1</sup>, Marina De Simone<sup>2</sup>, Monica Panero<sup>2</sup>, Ornella Robutti<sup>2</sup>

<sup>1</sup>University of New England, Australia; <sup>2</sup> Department of Mathematics, Turin University, Italy

In this paper, accounting for the complexity inherent in mathematics teaching practices within technology, we focus our attention, from the research point of view, on educational programmes for supporting teachers to integrate the use of digital technologies in their practices, aiming to help with their professional development. We examine the challenges of differentiating between micro and macro levels of complexity when dealing with unpacking teachers' professional development from a dynamic point of view through specific examples, contextualised in teachers' education at secondary school level, with the use of digital technologies. We use a theoretical framework comprising the Meta-Didactical Transposition model developed by Arzarello et al. (2014) that considers the evolution of the teachers' and researchers' praxeologies over time, and the notion of emergence that provides us with better insights into how the praxeologies' components have been constituted at the micro level. We applied the co-working of these two models in a cross-national analysis of a teaching experiment, centred on the introduction of GeoGebra in Australian and Italian secondary teachers' educational programmes. Through the lens of the co-working of these two models, we observed that for making the component of praxeology internal to teachers' communities, researchers fostered the implementation of activities involving GeoGebra and the mathematics laboratory practice as agents. Independent agents that were active during teachers' practices interacted with other agents at the micro-level to cause dynamic changes in the teachers' praxeologies when using GeoGebra for a particular activity, shaping their components, and leading to the development of new and/or shared praxeologies, as emergent phenomena arising from the process of teachers' development. However, not all the teachers reacted and changed in the same ways their praxeologies: for some of them change could not happen, for others it was immediate as an unexpected new awareness of teaching practices with GeoGebra, for others it took more time. But even if the final product could be different, the occasion of meetings between the community of researchers and that of teachers is nonetheless fruitful for the interaction of agents.

## References

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