

LEARNING TO ANALYSE STUDENTS' PROBLEM-SOLVING STRATEGIES WITH CARTOON VIGNETTES

Marita Friesen¹, Alyssa Knox¹, Ralf Erens¹, Salvador Llinares², Ceneida Fernández², Pere Ivars², Lulu Healy³, Sebastian Kuntze⁴, Jens Krummenauer⁴, Karen Skilling⁵, and Libuše Samková⁶

¹University of Education Freiburg, ²University of Alicante, ³King's College London, ⁴Ludwigsburg University of Education, ⁵University of Oxford, ⁶University of South Bohemia in České Budějovice

Problem solving is a core mathematical activity and part of curricula and national standards worldwide. Studies show that the flexible use of strategies (e.g., adapting the strategy to a given task) leads to higher performance in problem solving but also that many children struggle with applying strategies in a flexible way (Elia et al., 2009). The question of how future teachers can be supported in their learning about different strategies and their use in the mathematics classroom is consequently of high relevance. In a university course ($n=42$ participants), we provided a unit focusing on the use of primary-school students' problem-solving strategies. Since cartoons have the potential to represent classroom practice in a systematic and theory-based way (Friesen & Kuntze, 2018), we designed two types of cartoon vignettes to support the participants' learning: short cartoons, each illustrating a problem-solving strategy (e.g., work backwards, draw a picture) and more complex cartoons providing the opportunity to analyse how students use different strategies or struggle while solving a non-routine problem. The evaluation of the course was based on the analysis of a complex cartoon (pre-post) and a questionnaire. Our findings show that the participants perceived the cartoons as valuable learning opportunities. Learning to analyse students' problem-solving strategies could be supported but also needed guidance and specific support.

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References

- Elia, I., van den Heuvel-Panhuizen, M. & Kolovou, A. (2009). Exploring strategy use and strategy flexibility in non-routine problem solving by primary school high achievers in mathematics. *ZDM-Mathematics Education*, 41, 605-618.
- Friesen, M., & Kuntze, S. (2018). Competence assessment with representations of practice in text, comic and video format. In O. Buchbinder & S. Kuntze (Eds.), *Mathematics teachers engaging with representations of practice* (pp. 113-130). Springer.