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Periodicity in textbooks: reasoning and visual representations.

Lindmeier, Anke M. (ed.) et al., Proceedings of the 37th conference of the International Group for the Psychology of Mathematics Education “Mathematics learning across the life span”, PME 37, Kiel, Germany, July 28–August 2, 2013. Vol. 4. Kiel: IPN–Leibniz Institute for Science and Mathematics Education at the University of Kiel (ISBN 978-3-89088-290-1). 297-304 (2013).

Summary: This study aims to explore how the visual and the verbal components of texts from different subjects in specific topics related to the notion of periodicity interplay in the reasoning process. To this end, we developed an interdisciplinary framework on reasoning in texts. By comparing and contrasting the argumentation in two grade 11 texts from the subjects of mathematics and science we get evidence on how the reasoning is developed and on how this could affect students’ conceptualization. Our analysis identifies common reasoning behaviours in the different educational fields while different routes in reasoning could broaden and enrich students’ perceptions. Furthermore, our analysis illustrates the ‘flexible’ character of the visual components inside and across texts that could contribute to the formation of the invariant notion of periodicity.

Classification: I20 U20 E50

Keywords: periodicity; reasoning; visual representation; textbook analysis