REQUESTS FOR REASONING IN GEOMETRICAL TEXTBOOK TASKS FOR PRIMARY-LEVEL STUDENTS

Silke Ruwisch, and Stephanie Gerloff

Leuphana University of Lüneburg

Mathematical reasoning may lead to a deeper individual understanding. Although geometric learning at the beginning of school is still essentially visual and holistic, geometry becomes a popular content area for learning mathematical reasoning, argumentation and proof in secondary school (Battista, 2009).

Our textbook analyses from 2010 and 2016 (Ruwisch, 2017) showed that even over time, only less than 10% of the textbook problems in grades 3 and 4 ask for reasoning. Roughly two types of requests could be distinguished: explicit and more implicit requests. In nearly all textbooks, more problems asked implicitly for reasoning than explicitly. On average, implicit requests were twice as frequent as explicit ones, although the amount of explicit requests was slightly higher in fourth grade.

RESEARCH QUESTIONS

1. How often are requests for reasoning in geometrical tasks in comparison to other contents in the textbooks?
2. How can explicit and implicit reasoning prompts in geometrical tasks be linguistically differentiated in detail?

PROMPTS FOR REASONING IN GEOMETRICAL TEXTBOOK TASKS

The textbook series differ both in terms of the total number of (geometrical) tasks and the number of prompts for reasoning (in geometrical tasks). Whereas 8.5% of all textbook tasks require reasoning, a different picture occur, when focussing on the geometrical tasks only: On average, 14% of the geometrical tasks ask for reasoning, but only about 4% do it explicitly. Four explicit (reasoning, arguing, explaining, and proving) and five implicit (assuming, detecting, deciding, checking, and judging) reasoning competencies could be identified as task requirements. They will be presented in detail on the poster.

References

Battista, M. T. (2009). Highlights of research on learning school geometry. In T. V. Craine, & R. Rubenstein (Eds.), *Understanding geometry for a changing world* (pp. 91-108). NCTM.

Ruwisch, S. (2017). Requests for mathematical reasoning in textbooks for primary-level students. In B. Kaur et al. (Eds.), *Proceedings of PME41* (Vol. 4, pp. 113-120). PME.

2022. In C. Fernández, S. Llinares, A. Gutiérrez, & N. Planas (Eds.), *Proceedings of the 45th Conference of the International Group for the Psychology of Mathematics Education* (Vol. 4, p. 399). PME.