STUDENTS’ UNEXPECTED WAYS OF ENLARGING FIGURES

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The poster reports empirical results on students’ ideas of the geometric concept of similarity based on Brousseau’s Tangram task (1997, p. 177; Hodgen & Küchemann, 2013) which engages students actively in diverse individual ways of enlarging figures by uniform scaling. For grasping students’ ideas, I refer to Vergnaud’s construct of theorems-in-action that describe propositions that are individually “held to be true” (Vergnaud, 1998, p. 168). For the case of enlarging figures in the Tangram task, these are rules for enlarging sides and angles (e.g., adding a constant summand to each length or keeping the size of the angles).

Research question: Which theorems-in-actions can be identified in students’ individual ways of enlarging figures for the Tangram task?

The analysis is based on video data of 23 groups, each with 3 students from German comprehensive schools aged around 13 years. The Tangram task was the first task for them on enlarging figures. For the explorative analysis, relevant episodes were identified in the video data and transcribed. The qualitative analysis of the transcripts with respect to students’ theorems-in-action followed inductive category formation.

The analysis expands Brousseau’s observation of students enlarging figures by adding constant summands to each length: 8 identified theorems-in-action that will be visualized on the poster show the various rules students held to be true while solving the task. For example, students only enlarging vertical sides, enlarge all sides by an individually developed pattern, or enlarge the figure by keeping relations between sides in the original the same in the enlarged version. Interestingly, no student thought about enlarging by multiplying with a constant factor, which is often the only way displayed in German textbooks. These results inform the refinement of the teaching-learning-arrangement. Furthermore, the study contributes to expanding the little research on similarity (Jones & Tzekaki, 2016).

References


