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“If you can turn a rectangle into a square, you can turn a square into a rectangle ...” Young students experience the dragging tool.

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Summary: This paper describes a study of the cognitive complexity of young students, in the pre-formal stage, experiencing the dragging tool. Our goal was to study how various conditions of geometric knowledge and various mental models of dragging interact and influence the learning of central concepts of quadrilaterals. We present three situations that reflect this interaction. Each situation is characterized by a specific interaction between the students' knowledge of quadrilaterals and their understanding of the dragging tool. The analyses of these cases offer a prism for viewing the challenge involved in changing concept images of quadrilaterals while lacking understanding of the geometrical logic that underlies dragging. Understanding dragging as a manipulation that preserves the critical attributes of the shape is necessary for constructing the concept images of the shapes.

Classification: G43 C33 U53 R23

Keywords: dynamic geometry environment; dragging; mental models; cognitive complexity; critical attributes; hierarchical relations; quadrilaterals; lower secondary; educational research

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