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A framework for mathematics graphical tasks: the influence of the graphic element on student sense making.

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Summary: Graphical tasks have become a prominent aspect of mathematics assessment. From a conceptual stance, the purpose of this study was to better understand the composition of graphical tasks commonly used to assess students' mathematics understandings. Through an iterative design, the investigation described the sense making of 11–12-year-olds as they decoded mathematics tasks which contained a graphic. An ongoing analysis of two phases of data collection was undertaken as we analysed the extent to which various elements of text, graphics, and symbols influenced student sense making. Specifically, the study outlined the changed behaviour (and performance) of the participants as they solved graphical tasks that had been modified with respect to these elements. We propose a theoretical framework for understanding the composition of a graphical task and identify three specific elements which are dependently and independently related to each other, namely: the graphic, the text, and the symbols. Results indicated that although changes to the graphical tasks were minimal, a change in student success and understanding was most evident when the graphic element was modified. Implications include the need for test designers to carefully consider the graphics embedded within mathematics tasks since the elements within graphical tasks greatly influence student understanding.

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