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Problem solving and the use of digital technologies within the mathematical working space framework.

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Summary: The aim of this study is to analyze and document the extent to which high school teachers rely on a set of technology affordances to articulate epistemological and cognitive actions in problem solving approaches. Participants were encouraged to construct dynamic representations of tasks and always to look for different ways to identify and support mathematical relations. To this end, three interrelated geneses (instrumental, semiotic, discursive) proposed in the Mathematical Working Space frame are used to document ways in which the participants constructed dynamic configuration of mathematical tasks as a means initially to explore invariants and eventually formulate conjectures based on empirical arguments. Technology affordances that involve dragging objects, quantifying parameters, graphing loci and using sliders were important for the participants to articulate semiotic and discursive geneses. Thus, the participants' approaches that appeared individual, small group and plenary discussions contributed to identifying initial conjectures that later were analyzed via empirical, geometric or algebraic arguments. In addition, the participants recognized that a working space to understand mathematical ideas and to solve problems should foster mathematical discussions beyond formal settings. The use of digital technologies plays an important role in both representing and exploring mathematical tasks and in following the discussion outside the formal class. As a result, the participants outlined a possible route to implement a route for learners to integrate activities to account for instrumental, semiotic, and discursive genesis.

Classification: D50 U70 C70 D40

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