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Students' mathematical work on absolute value: focusing on conceptions, errors and obstacles.
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Summary: This study investigates students' conceptions of absolute value (AV), their performance in various items on AV, their errors in these items and the relationships between students' conceptions and their performance and errors. The Mathematical Working Space (MWS) is used as a framework for studying students' mathematical work on AV and the obstacles that hinder their work in Turkey and Cyprus. A comparative study between the two countries is undertaken, by which a deeper understanding on students' personal MWS on AV is gained. Specifically, a survey was carried out in Turkey, following a similar survey in Cyprus, in which secondary school students' performance was assessed using a test. Findings showed a discrepancy in the conception of AV that was most prevalent in each country, indicating the differences in the reference and suitable MWS between the two countries. For Turkey, the conception of AV as distance from 0, which was the most widely used definition, gave a positive support to the solution of items involving discursive reasoning. This was not the case for Cyprus, in which the most prevalent conception of AV was "number without sign". An analysis of the Turkish students' errors revealed a distinction between errors in students' discursive genesis and semiotic genesis, which were a consequence of either didactic or epistemological obstacles that intervened in students' personal MWS.

Classification: D70 H20 H30 F40

Keywords: absolute value; mathematical working space; obstacles; discursive genesis; comparative study
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