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An integrated game-based approach for assessing mathematical performance and related affective factors

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Italian students have consistently underperformed in international mathematics assessments. Thus, innovative approaches to support learning in this domain are necessary. Educational games, which incorporate game-like elements into learning and assessment, have emerged as promising tools for enhancing students' engagement and improving learning outcomes. Moreover, affective components and attitudes toward mathematics are recognized as critical contributors to students'mathematical learning trajectories. This study aimed to develop a digital tool designed to assess mathematical competence and emotional responses to mathematics in children aged 6 to 11, enabling an integrated evaluation approach. The psychometric properties were analyzed using the two-parameter logistic (2PL) model inside the Item Response Theory (IRT) framework. A total of 1.012 primary school students (50% male), attending 1st through 5th grade, participated in the study. Scores on the performance component of the digital tool showed positive correlations with the Written Operations subtest of the AC-MT 6–11, a standardized measure of mathematical competence. The unpleasantness experienced in response to math-related stimuli was negatively associated with students'attitudes toward mathematics and effectively discriminated between different levels of math anxiety. Scores obtained from the digital tool also significantly contributed to explaining teacher-rated mathematical performance. These findings support using gamified tools in primary education to assess and monitor both performance and affective aspects of math learning.

If you're submitting a symposium talk, what's the symposium title?

Innovations in psychometric modelling: New approaches to understanding psychological measurement

If you're submitting a symposium, or a talk that is part of a symposium, is this a junior symposium?

No

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