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Adaptive Spaced Retrieval Practice in Algebra I: A Classroom-Based Study

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Abstract

Despite a robust body of research supporting the benefits of spaced retrieval practice, few studies have implemented this approach in mathematics education within real-world classroom settings while addressing individual differences, such as variations in students' prior knowledge and performance levels. The current study tested adaptive spaced retrieval practice in Algebra I classrooms using a computerized system powered by the SuperMemo 2 (SM2) algorithm. Algebra I students practiced 10 selected learning objectives (LOs), with 6 assigned to the adaptive spaced practice condition and 4 to a no-practice control condition. Results revealed that LOs with lower initial accuracy were practiced more frequently with narrower spacing intervals. In contrast, LOs with higher initial accuracy received fewer practices with wider spacing, leading to significant improvements in accuracy from pretest to posttest. Although no significant differences were observed between the spaced practice and no-practice conditions, the findings highlight the potential of adaptive spaced retrieval systems to address individual learning needs to optimize their effectiveness in mathematics education.