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Prior Knowledge Adaptation Through Item-Removal in Adaptive Learning Increases Short- and Long-Term Learning Benefits

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Abstract

In personalized-schedule learning, previous research has shown the benefit of initial attempted retrieval of study-items on short-term retention and later test performance. As a way of prior-knowledge identification, initial attempted retrieval may help to optimize learning and long-term performance further, through the removal (or 'drop') of items from the learning set that are answered correctly on the first attempt. This study sought to support this hypothesis through a real-world, within-subjects experiment, comparing vocabulary test performance of Dutch middle school students after the use of a drop- and non-drop adaptive learning algorithm. The results show that short- and long-term item retention was higher for material studied using the drop-algorithm, while dropping items did not lead to worse retention compared to items that were kept upon initial correct responses. This suggests that initially-known items are correctly identified as 'mastered', and that their removal from the learning material allows students to focus their efforts on unknown items, leading to increased learning gains.