Short and long-term effects of a mathematics tablet intervention for low performing second graders.

# Details

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## Topics

## Sample

283 low performing second-grade students from Sweden.

## Implications For Educators About

## Implications For Policy Makers About

Other

## Other PolicyMaker Implication

Impact of tablet interevention on low-performing young students' mathematics performance

## Implications For Stakeholders About

# Abstract

Using a randomized placebo controlled design, we examined the direct and follow-up effects (at 6 and 12 months) of a mathematics tablet intervention. Math training focused primarily on basic arithmetic (addition and subtraction facts up to 12), and secondarily on number knowledge and word problems. We investigated the moderating effects of IQ and socioeconomic factors, and additive effects of working memory (WM) training. A representative sample of 283 low performing second-grade students were randomly assigned to control (n = 52), reading placebo (n = 78), math intervention (MA; n = 76), or math plus WM training (MA + WM; n = 77). Both math conditions scored significantly higher than control and placebo on the posttest of basic arithmetic, but not on arithmetic transfer and problem solving. WM training did not show additive effects. Given the virtually identical patterns, we collapsed the control and placebo, respectively, MA and MA + WM conditions. The collapsed MA/MA + WM condition demonstrated significant medium-sized effects (d = 0.53-0.67) on basic arithmetic compared with the collapsed control/placebo condition at posttest. There was a fadeout of effects at 6-month follow-up (d = 0.18 -0.28), that declined further at 12 months (d = 0.03-0.13). IQ was a significant moderator of direct and long-term effects on addition up to 12 and subtraction up to 18, where students with lower IQ benefitted more than higher IQ students. Socioeconomic factors did not moderate outcome. The intervention effectively improved basic arithmetic among low performing second graders. Although the effects waned at 6-month follow-up, there was some indication that children with lower IQ demonstrated sustained gains.

Educational Impact and Implications Statement

This study shows that adaptive math training on tablet can help low performing 8-year-olds catch up about half a year of schooling in critical math skills. Students with lower IQ benefitted in particular and made long-term gains 12 months after training finished. Additional short-term memory training did not result in further math improvement. Because math is a strong predictor of later school achievement, these findings highlight the potential of well-designed adaptive teaching on tablets to significantly improve students' success at school. Evidence-based programs covering the bulk of elementary math might be widely spread, potentially at a low cost.

# Outcome

"Additional math training on tablet, based on behavior analysis and adaptive technology, can potentially help young low-performing students decrease the achievement gap to their higher performing peers in mathematics. A tablet intervention should allow for a less costly, and a more standardized and scalable way (i.e., due to the technological format) to increase skills among low performing students compared with current effective programs using tutoring in small groups for the same purpose." (Authors, 1145)