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A Suite of Adaptive Games for Self-Directed Literacy and Numeracy Education

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Abstract

250 million children worldwide lack basic literacy and numeracy skills, many of whom have no access to regular schooling. Inexpensive tablet computers have the potential to scale up the distribution of intelligent tutoring systems to children in need. We introduce a collection of tablet games presenting core literacy and numeracy concepts in a way that enables self-directed learning, reinforced by a shared content engine with an adaptive algorithm that re-prioritizes content based on the accuracy and timing of the learner's responses to effectively space and distribute practice. The difficulty of each game's dynamics adjust to the learner over time. We analyze response data from school children in Tanzania, examining how they distribute their attention across the games and as a function of performance within each game. We also evaluate different methods for determining their knowledge state and learning progress based on their responses, and examine how self-direction influences stimulus spacing.