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Digital Meets Complex Systems: Success in Reading Comprehension

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ABSTRACT

Reading comprehension is a human right and uplifts all academic, professional, personal health, civic engagement, and economic security. This paper presents strong research and evidence about the knowledge acquisition and transformation (KAT) framework that has produced outstanding comprehension outcomes for all children including dyslexic, monolingual, bilingual, and special education students in elementary, middle, and high schools. A hallmark of the success is the implementation science approach to identifying the root causes of the comprehension problems and developing and deploying web-based solutions for the entire system. In this paper, we present the teacher and instructional factors that cause problems for students and the technology and professional development solutions we applied to solve the problems. Using a strong randomized controlled trial design, we compared intervention group teacher content and pedagogical knowledge to the control group and found statistically significant and large effect sizes favouring the intervention group that received two days of practice-based professional development. For school instructional factors, we implemented a 20-minute pre-English language arts lesson that showed students how to read and select important ideas to generate a main idea, summary, and inference about the text. This routine was practiced daily for narrative, expository, biography, and poetry text. Stellar results were reported for all students.

Keywords: comprehension, web-based intelligent tutor, mental model, teacher knowledge, school systems change.