

Preschool Teachers Can Use a PBS KIDS Transmedia Curriculum Supplement to Support Young Children's Mathematics Learning:

Results of a Randomized Controlled Trial



Executive Summary



Summative Evaluation of the
CPB-PBS *Ready To Learn Initiative*

November 2013

Context

The CPB-PBS *Ready To Learn initiative*, funded by the U.S. Department of Education, brings engaging, high-quality media to young children who may be at risk for academic difficulties due to economic and social disadvantages. The initiative aims to deliver early mathematics and literacy transmedia resources on new and emerging digital platforms such as tablet computers, interactive whiteboards (IWBs), and smartphones, as well as better-established technologies such as computers, video displays, and gaming consoles, to create learning experiences that leverage the unique capabilities of these technology platforms. For the purpose of this study, transmedia means the use of familiar characters, settings, and narrative themes or stories across different media formats, such as digital video, interactive online games, and interactive whiteboard applications.

Study Overview

The 2013 PBS KIDS Transmedia Math study is an important part of the multiyear *Ready To Learn* summative evaluation conducted by the Education Development Center, Inc., (EDC) and SRI International (SRI) for the Corporation for Public Broadcasting (CPB) and PBS. This study utilized a randomized controlled trial (RCT) design to explore how technology and educational transmedia resources can enhance prekindergarten mathematics teaching and learning in preschools, preparing children, especially those who may be at risk for academic difficulties due to economic and social disadvantages, for kindergarten.

The study lasted ten weeks and focused on supporting the growth of mathematics skills such as counting; subitizing; recognizing numerals; recognizing, composing, and representing shapes; and patterning.

The design included three conditions:

- PBS KIDS Transmedia Math Supplement
- Technology & Media
- Business-As-Usual

The PBS KIDS Transmedia Math Supplement condition provided classrooms with digital tools (i.e., interactive whiteboards and tablet computers), instructional support (i.e., coaches), and a structured curriculum supplement that supported teachers in integrating PBS KIDS transmedia into regular classroom instruction and routines. The Technology & Media condition provided the same digital tools and instructional support as the PBS KIDS Transmedia Math Supplement condition, but did not provide a curriculum supplement for guiding the selection and use of the digital resources. Teachers in the Business-As-Usual condition continued to engage in their typical mathematics activities without the addition of any digital tools, instructional support, or curriculum supplement.

Methods and Sample

The study included 966 four-year-old children in 87 prekindergarten classrooms from the New York City and San Francisco Bay areas that serve economically disadvantaged families. The research team examined outcomes for both children and teachers.

Child math outcomes were measured using a standardized assessment of children's mathematics skills, the Research Based Early Mathematics Assessment (REMA short form), as well as a Supplement-Based Assessment (SBA) developed by the research team to closely align with the mathematics targeted in the PBS KIDS Transmedia Math Supplement and the Technology & Media conditions. In addition, a recently developed and validated measure of young children's behavioral self-regulation, the Head-Toes-Knees-Shoulders (HTKS) measure, was included to evaluate any changes in children's self-regulation that might be related to participation in the study.

Teacher outcomes were measured through pre- and post-teacher surveys that focused on attitudes and beliefs toward teaching preschool mathematics and using technology for instruction with young children. A range of implementation data were also collected to evaluate how the curriculum supplement and technology were used in classrooms. Implementation data were gathered through classroom observations, teacher logs, and, in classrooms where instructional support was provided, through coach logs.

Findings

Children who participated in the PBS KIDS Transmedia Math Supplement condition learned significantly more mathematics than did children in both the Business as Usual and Technology & Media conditions. Specifically, children in the PBS KIDS Transmedia Math Supplement group improved significantly in their understanding of the targeted early mathematics skills as measured by the SBA compared to children in the other two study conditions. There were also marginally significant changes on the REMA-short form that were consistent with the results from the SBA.

Teachers who participated in the PBS KIDS Transmedia Math Supplement condition experienced significant benefits as well. PBS KIDS Transmedia Math Supplement teachers' beliefs about their own mathematics knowledge and the benefits of technology experiences for preschoolers improved after the study.

Conclusion

The study results demonstrate that, when used in particular ways, PBS KIDS transmedia can advance content-area learning for young children from economically disadvantaged backgrounds who are often less prepared for kindergarten than are their more socially and economically advantaged peers. The study also shows that with adequate support, no one is better positioned to support learning through media engagements than early childhood educators. Finally the study supports the view that PBS KIDS curriculum materials can be a powerful support for teaching, especially when teachers are integrating technology and media into their existing routines.

The full report provides detailed information about the overall study design including limitations, implications, and recommendations for future research. It also includes additional material about the three study conditions, instructional support received by teachers, and the PBS KIDS Transmedia Math Supplement.

Education Development Center, Inc. | Center for Children and Technology

The Center for Children and Technology (CCT) is a unit of Education Development Center, Inc., a nonprofit international research and development organization dedicated to improving the quality, effectiveness, and equity of education throughout the United States and in more than 35 countries. Since 1981, CCT has been at the forefront of creating and researching new ways to foster learning and to improve teaching through the development and thoughtful implementation of new educational technologies. CCT's work is centered in three areas: research, including basic, formative, and program evaluation; design and development of innovative technology prototypes and products; and the implementation and operation of large-scale technology integration efforts.

SRI International | Center for Technology in Learning

SRI International is an independent, nonprofit research institute conducting client-sponsored research and development for government agencies, commercial businesses, foundations, and other organizations. The mission of the Center for Technology in Learning (CTL) is to improve learning and teaching through innovation and inquiry. CTL research and development activities contribute to the knowledge base of effective learning and teaching and embody research insights in the innovative design, use, and assessment of interactive learning environments. In its development, research, and evaluation work, CTL seeks to create tools that lead to better teaching and learning, to develop assessments and conduct evaluations that contribute to the evidence base about the effectiveness and conditions for success of technology-supported innovations, and to inform both the policy and research communities.

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