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Introduction

We present our findings from three years of our summative evaluation of Ready To Learn, a U.S. Department of Education-supported initiative that aims to develop media-rich learning resources for young children from traditionally economically disadvantaged communities.



In partnership with the Corporation for Public Broadcasting (CPB) and Public Broadcasting Service (PBS), Education Development Center, Inc. and SRI Education seek to document and measure the impact of transmedia mathematics resources on learning across a variety of settings: early childhood classrooms, in the community, and at home. These studies focus on the use of PBS transmedia resources in preschool classrooms.



Approach

- Developmentally appropriate media and technology promote early learning in various domains¹
- Media offers several affordances to improve learning:
 - Multiple, dynamic representations of content
 - Opportunities for repetition
 - Interactivity
 - Timely feedback
 - Powerful modeling
 - Opportunities for fostering children's interest and motivation²
- It is important, therefore, to understand:
 - The current state of digital media use in early childhood classrooms
 - How media might fit into an instructional day
 - How it might be introduced, described, and used by adults
 - How it might change children's conversations
 - What support teachers might need to provide instruction that centrally involves media and technology³



¹ Clements & Sarama, 2007, 2008; Linebarger & Piotrowski, 2009; Neuman, Newman, & Dwyer, 2011; Penuel, et al., 2012; Starkey, Klein, & Wakeley, 2004
² Townsend, 2011
³ Guemsey, 2007

Research Activities

Year 1: Survey of Target Programs & Program Quality Observation Study

- **Study aim:** to develop an understanding of the context needed to support the design of the media-rich curriculum supplement
- **The Survey:**
 - 106 preschool teachers
 - Identifying current technology use and program structure
 - Measuring staff attitudes toward the use of media for learning
- **The Observation Study:**
 - 32 preschool classrooms
 - Focusing on prevalent teaching practices
 - Identifying current and potential future integration of technology into classroom practice



Year 2: PreK Pilot Study of PBS KIDS Transmedia Math Content

- **Study aim:** to pilot and refine a media-rich curriculum supplement
- 16 preschool classrooms
- 10-week media-rich curricular supplement with teacher PD program
- Implementation data and math assessment data collected
- PBS videos and online games on laptops and interactive whiteboards

Year 3: PreK Transmedia Math Randomized Controlled Trial

- **Study aim:** to test the effectiveness of a media-rich curriculum for teaching math
- 86 preschool classrooms
- 10-week PBS KIDS Transmedia Math Supplement
 - Curates media-rich and non-media activities
 - Support children's growth of target math skills
- Provided on-site instructional and tech support

Three Conditions

PBS KIDS Transmedia Math Supplement	Technology & Media	Business as Usual
Enacted a supplementary curriculum including Ready To Learn videos and games, non-digital activities, teacher PD, and on-going coaching support. Had access to interactive whiteboards, laptop computers, and broadband Internet access.	Asked to use technologies and transmedia materials to target the same math skills as the PBS KIDS Transmedia supplement condition. Received teacher PD and on-going coaching support; had access to interactive whiteboards, laptop computers, and broadband internet.	Continued providing the same learning opportunities as before the study began. Did not receive teacher PD, coaching, or new technology.

Year 3 Implementation Schedule

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18		
	Preparation			Study Implementation											Post					
Technology	Tech Installation			Ongoing In-Classroom Technology Support											Tech Redistribution					
Child Data Collection	Child Pre-Assessments			Ramp Up		Full Implementation of Curriculum Supplement with Teachers and Children											Child Post-Assessments			
Coaching and PD	Teacher Professional Development			Coaching											Close-out Visits					
Teacher/Classroom Data Collection	Teacher Survey			Implementation Observations											Teacher Survey					

Findings

Year 1

Approaches to Classroom Use of Media

Free Play	Opportunistic	Media-Centered	Sequenced
Child-directed and separate from other class activities; a chance to have fun and explore away from structured lessons, and a way to log time with tech tools unavailable at home	Child-directed media use is related to concepts or skills already encountered; teacher engagement is spontaneous and short	Teacher-designed media activities tied to broader learning goals; each activity considers what a technology tool or media asset can do to support specific kinds of learning	Teacher-selected activities that take advantage of media and non-media experiences; play is part of a seamless instructional array that addresses key concepts and skills

Ways Children Experience Media

Teacher-Led	With Classmates	Solo
Whether as a whole class, in small groups, or with an individual child, the technology tool is controlled by a teacher, typically part of an activity intended to focus children's attention rather than to provide a hands-on media experience	Using media in pairs or small groups creates the chance for turn-taking, cooperative learning, and social development, in addition to learning academic skills and content knowledge	Independent media experiences rely on a child's prior knowledge, individual mastery, and technological fluency; the child controls the experience, using her own hands and judgment to navigate the activity

Roles Teachers Take in Supporting Children's Media Use

Tech Support	Pop-Up Guide	Sherpa	Creative Director
The teacher jumpstarts children's media use, keeps them from getting stuck when a technical problem arises, and helps them move to another activity when it is time to transition	The teacher makes welcome, surprise visits to children's media play, turning an otherwise stand-alone technology experience into a stand-beside engagement	Teacher sticks with a media experience a child is having, nimbly making use of the tool's format and functions to draw the child into a rich exchange and guide them through it	Teacher helps children use media tools to generate content and express themselves, often over a longer period of engagement

Year 2

Activity Formats and Their Affordances

Video Co-viewing	Interactive Whiteboard Games	Computer Center Time
A "gentle" introduction to math skills	An opportunity for scaffolding	An opportunity for independent practice and child collaboration

Keys to Successful Implementation

Adult mediation of child transmedia use	Significant planning and preparation by teachers	Just-in-time guidance from coaches
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Year 3

The PBS KIDS Transmedia Math Supplement Condition

Children improved significantly in their understanding of the targeted math skills compared to the other two conditions	The curriculum supplement may have provided greater benefit for those children who scored lowest on the pre-assessment	Teachers shifted in their beliefs about their own math knowledge and about the benefits of technology for preschoolers
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