PEG+CAT Content Study:
Report to the CPB-PBS Ready To Learn Initiative

Executive Summary

October 2014
EDC’s Center for Children and Technology and SRI Education’s Center for Technology in Learning (EDC/SRI) conducted this study as part of the summative evaluation of the CPB-PBS Ready To Learn Initiative. The purpose of the CPB-PBS Ready To Learn PEG+CAT Content Study was to explore, in a controlled environment, to what extent children can learn mathematics from PEG+CAT outside of instructional environments and relationships; how parents\(^1\) perceived the resources; and how well children are able to engage with these resources independently.

PEG+CAT is a unique transmedia property that emphasizes early mathematics and problem solving. It includes video episodes, online games, and a tablet-based app, all of which allow children and their families to engage with the same characters, settings, and narratives on multiple devices, across various physical and social settings. Researchers identified and chose to include PEG+CAT assets focused on patterns and shapes for this study.

Resources focusing on counting and number relationships also were used to introduce the characters, narratives, and media experiences that would comprise the study experience, as these skills are familiar to young children and their families. The curated materials were sequenced to optimize opportunities for learning.

The study included five weekly sessions, each lasting approximately one hour. These sessions occurred in a laboratory setting and were largely unmediated opportunities for children to interact with videos and games. Each week children and their parents met with a researcher who administered pre- and postassessments and guided PEG+CAT viewing and gameplay. Parents were present throughout the experience and their perspectives were included in data collection activities.

The final study sample included 59 children (aged between 4 years, 1 month, and 5 years, 5 months) from low-income communities in the New York Metropolitan and San Francisco Bay Areas. The study sample was ethnically diverse: 60% Hispanic/Latino, 25% African American, and 14% mixed/other.

Results indicated that children participating in the CPB-PBS Ready To Learn Initiative Content Study showed positive shifts in identifying some geometric shapes on a researcher-developed measure aligned to the intervention and in overall math skills on a standard math learning measure, the Research Based Early Mathematics Assessment (REMA) short form. Parents reported positive impressions of the PEG+CAT resources, and also noted that their children often referred to PEG+CAT and engaged in PEG+CAT-inspired play outside of the study.

\(^1\) “Parents” refers to all primary caregivers, no matter their relationship to the child.
Children's Learning

Children's performance improved significantly from pretest to posttest on a shape identification task on a researcher-developed measure aligned with the PEG+CAT study experience. On additional shape identification and pattern tasks, children showed positive, nonsignificant gains on the same measure.

Children's performance on a standardized assessment (REMA) improved from pretest to posttest.

Parent Perspectives

Nearly all parents reported strong positive impressions of PEG+CAT and viewed the resources as having considerable potential to support children's mathematical learning.

Parents reported that children talked about PEG+CAT at home, after and between study sessions, and that interacting with the PEG+CAT materials appeared to influence children’s behavior at home.

Half the participating parents reported they worked with their children on activities related to PEG+CAT at home.

Children’s Engagement

Children showed signs of positive engagement, like watching intently, counting along, or “interacting” with characters while watching PEG+CAT videos and playing PEG+CAT games.

Most children were able to identify and talk about the characters, setting, and other story elements of the videos, and more than half were able to describe the mathematical problem and the solution around which the episode revolved.

Children were able to engage independently with the games during the majority of sessions.

Study Design

This study was conducted in spring 2014 in New York City and the San Francisco Bay Area.

All children who participated in the study were provided with opportunities to view PEG+CAT videos and play PEG+CAT digital games and activities under controlled non-instructional conditions in lab spaces at EDC and SRI offices. The study used a pre/post design with no comparison or control group.

Researchers collected data using standard and researcher-developed experience-aligned assessments, researcher observations, and parent observations of children’s behaviors during study times, and interviews with parents.
Research Questions

The PEG+CAT Content Study design addressed three research questions. The first question concerned the degree to which children learned new mathematics knowledge and skills. Two assessments, the Research Based Early Mathematics Assessment [REMA] short form, which is a standard measure, and one developed by the research team (PEG+CAT Item Sets, PCIS), were used to collect data to address this question:

RQ1: Do children who engage with selected PEG+CAT videos and games independently in a controlled, non-instructional environment over the course of five sessions improve in target mathematics skills as measured by
   (a) a standardized early childhood mathematics assessment; and
   (b) a researcher-developed measure aligned with the videos and games included in the study experience?

The second question addressed parents’ perspectives of the transmedia content and their children’s mathematics experiences. During the fifth week of the study, parents were asked to respond to a set of open-ended questions about their impression of the resources as supportive of learning and about their child’s behavior with regard to any references to the PEG+CAT resources.

RQ2: How do parents view the potential of PEG+CAT content to support children’s mathematics learning?

The third question addressed children’s engagement with the transmedia and also the potential need for mediation or support for children’s use of the games, videos, and activities. Researchers completed observations during children’s study activities, and parents also completed observation checklists to contribute their perspective on their children’s engagement and perceived need for any assistance.

RQ3: How do children attend to particular PEG+CAT media experiences? What assistance or support, if any, do they require to participate while engaging in the media experiences?

This CPB-PBS Ready To Learn Initiative Content Study adds to our collection of Ready To Learn Initiative studies demonstrating that public media resources, and the transmedia strategy that has been the focus of the Ready To Learn Initiative, have the potential to support children’s math learning and problem-solving skills.
The Center for Children and Technology (CCT) is a unit of the 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 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.

Principal Investigators

Shelley Pasnik
sp@edc.org

Carlin Llorente
carlin.llorente@sri.com

Support Provided By

The contents of this document were developed under a cooperative agreement from the U.S. Department of Education (Award Number U295A1005). However, these contents do not necessarily represent the policy of the U.S. Department of Education and you should not assume endorsement by the Federal Government.