

Peg + Cat: Early Learning of Math Through Media

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Project Overview

Using a combination of *Peg + Cat*, an animated math-based PBS television series for preschoolers; professional development (PD); family engagement resources; and the existing infrastructure of a regional Head Start system, this project aims to increase participating educators' and families' comfort and engagement with mathematics.

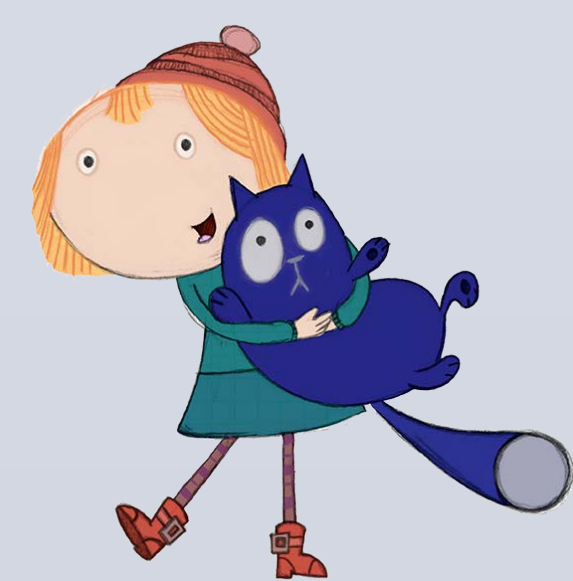


Project Goals

- Deepen the field's understanding of how to advance early learning in mathematics
- Produce *Peg + Cat*, an animated broadcast series, and web and mobile games that kids love and that get kids excited about math
- Help children develop math content knowledge, skills, and problem-solving/reasoning abilities
- Help children develop a positive and persistent attitude toward learning mathematics
- Increase preschool teachers' knowledge of math content and pedagogy, as well as their confidence
- Increase parents' interest, engagement, and confidence in exploring mathematics with their children

Big Messages

- Math is everywhere.
- Math is important.
- Everyone can use/learn math.
- Persistence in problem-solving is essential.
- Math learning begins early in life and should be both supported and encouraged.



Production

- Season 1 of *Peg + Cat* episodes
- 8 online games
- "Big Gig" App

Professional Development

- 58 Head Start teachers and educational supervisors
- Two-year, two-cohort PD model: one summer, one school-year
- Developmentally-appropriate math content: pre-number, number concepts, operations, geometry, and measurement
- How to incorporate math into everyday routines with children
- How to build families' confidence and interest in math
- Educator and Facilitator Resource Guides

How Peg + Cat Media was used in PD

- To deepen the teachers' own mathematical content and/or pedagogical content knowledge
- To demonstrate to teachers how to make use of *Peg + Cat* resources within their classrooms
- To provide a backdrop through which families can engage mathematically with their children



Family Engagement: *Peg + Cat + Us*

- Focus on exploring math with young children in everyday contexts and through simple games and activities
- Family activity days
- Take-home materials
- Classroom lending box



Mixed Research and Evaluation Methods

Surveys, content assessments, focus groups, interviews, PD observations, classroom observations, administrative data

Research Questions

- Do participating educators:
 - Develop or extend their knowledge of age-appropriate mathematics content?
 - Integrate effective practices to support mathematical learning among students?
 - Increase their confidence and self-efficacy in teaching math to pre-K children?
- How do the project resources help parents engage their children in math?
- Does the integration of *Peg + Cat* media into PD help support teachers' positive attitudes and comfort with mathematics?
- Does the integration of *Peg + Cat* media into family engagement materials help support parents' positive attitudes and comfort with mathematics?



Preliminary Research Findings

- Educators reported significant increases in their confidence in teaching math.
- Teachers showed significant gains in their perceived preparedness to teach concepts related to number.
- Almost all teachers engaged students in counting, and in many cases adding, subtracting, and patterning during large group circle/daily routine time.
- Higher implementers were able to facilitate mathematical thinking during transitions and throughout the day, versus only during circle time.
- Teachers asked higher-level questions and/or meta-cognitive questions, such as "Why do you think that?" or "Can you tell me how you got that?" as compared to simple yes/no questions.

Challenges

- Scheduling professional development
- Measurement development: dearth of measures focused on early math
- Limited technology in Head Start classrooms

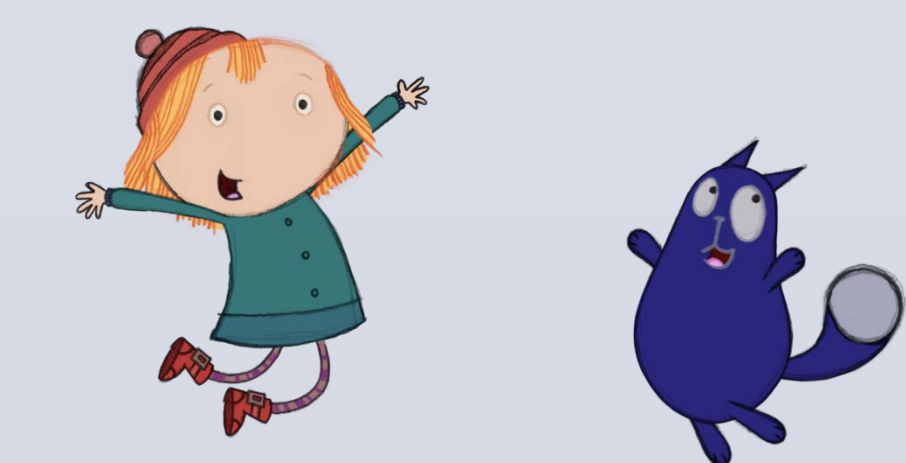


Evaluation Questions

- What are the key teacher-reported program elements that support or hinder transfer of knowledge to pedagogy?
- What are the key parent-reported program elements that support or hinder parents':
 - Interest, engagement and confidence in exploring math with their children
 - Development of knowledge of math as accessible and important for their children
 - Development of strategies to support children's mathematics learning and engagement?
- Does teachers' participation in the project's professional development and children's involvement with program resources and activities impact children's interest in and positive and persistent attitudes towards mathematics?
- How did teachers and parents use the project resources and strategies?

Preliminary Evaluation Findings

- Educators reported that they got new information and ideas about how to incorporate math into their classrooms, and appreciated the opportunities that the PD provided to interact with their colleagues.
- On average, compared to the beginning of Year 2, at the end of Year 2, parents reported that:
 - Their children tried more often to figure out problems on their own.
 - It was more important to expose their children to math at home.
 - They participated more in activities that involved math at Head Start
 - They talked to their children about math more.
- A significantly higher percentage of parents reported that their children used *Peg + Cat* media with a parent or other adult family member at the end of Year 2.



Insights

- Develop and agree on a logic model to use as a working document early on
- Do not underestimate the time and resources needed for data collection in Head Start programs

For more information about this project, please contact Dr. Mallary Swartz at swartz@fredrogers.org.