

# Preschool Science: Collaborative Approach to Teaching and Learning

Soo-Young Hong, PhD  
Shaista Syeda, MS  
Jungwon Eum, MS



Child, Youth and Family Studies  
College of Education and Human Sciences  
University of Nebraska-Lincoln

# Introduction

- Early childhood teachers reported that they feel least competent about teaching science-related curricula (Torquati et al., 2013).
- One of the most important tasks in early childhood science education may be to empower teachers by working with them from where they are and enable them to become an active planner, implementer, and evaluator of their own learning.

# Introduction

- Coaching has been recognized as one of the effective early childhood professional development tools through which teachers receive individualized support in implementing evidence-based practices (Powell et al., 2010).
- To enhance and sustain high-quality professional practices, PD should be “self-sustaining and growth producing” (Sheridan et al., 2009, p. 380).

# We Wondered if...



- We could **create collaborative learning communities** with preschool teachers to explore ways to promote teachers' understanding of science concepts and scientific problem-solving skills
- We could introduce preschool teachers to ways to create **developmentally appropriate science activities** for preschool children

# We Wondered if...



- We could **examine how teachers' attitudes about teaching science change** over the course of the collaborative process
- (We could investigate how children's science learning changes over the course of the collaborative process)

# So We Proposed...

- A professional development model that is based on the community participatory research where participants from the university and the community collaborate in planning, implementing, and reflecting on the shared practices.

- A pilot study



# Participants

- 6 preschool teachers from a community child care program in Lincoln, Nebraska
  - 4 teachers with CDA; 1 with BS in Elementary Ed; and 1 with BA in Applied Psych & Human Services
  - EC teaching experience: 1 month to 10 years
  - Question: Prepared to teach science?
    - 3 fairly unprepared
    - 1 moderately unprepared
    - 1 fairly prepared
    - 1 very well prepared

# Procedures

- Pre-session Interviews – initial meeting
- 8 monthly sessions
  - 2 teachers + 2 researchers (+ content experts)
  - Co-constructed; co-planned
  - General information on early childhood science teaching + class-specific resources and planning
  - Highly responsive; highly individualized
- Post-session interviews



# Initial Interviews



- Background and experience
- General beliefs about children's learning and development
- Current science teaching practices
- Challenges in teaching science
- Needs and expectations
- Next steps

# Our Observations

- “Science is everywhere!”
- A lot of enthusiasm about teaching science
- Episodic science activities
- “Science is magic.”
- Weak link between perception and practice

Observation

# Teachers Wondered About...

- Resources and tools
- Ideas and information
- Individualization (mixed-age classes)
- Effective ways to incorporate science into other areas
- Developmentally appropriate ways to explain science content
- Children's engagement in science
- In-depth, long-term investigations

Needs

# Intentionality

Science is everywhere; Science is magic;  
Episodic science activities; enthusiasm;  
Weak link between perception and practice

Observation

Resources; Tools; Ideas; Information;  
Individualization; Integration;  
Engagement; In-depth, long-term  
investigations

Needs

Individualized sessions; Children's  
interests; Project-based; General  
knowledge about EC science; Resources;  
Systems thinking; Family-school  
connections

Plans

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Plans

# Footprints

- “My Science Book”
  - Resources
- [Discussion logs on Google Doc](#)
  - Planning
  - Communication
- [Newsletters for families](#)
  - Family-school connections
- Artifacts from teachers and children
  - Lesson plans
  - Documentations
  - Assessment





# Discussion

- In order to build a more sustainable professional development program in preschool science education, it is critical to involve teachers in all phases of the program.
- More conversations are needed about (a) the relation between how preschool teachers define science and how they feel about teaching science and (b) more effective and efficient ways to incorporate science into classroom teaching.

# Implications

- What are take-away points?
- How can information from this study inform or advance early childhood practice?
- How can information from this study inform or advance early childhood public policy?
- What additional research is needed to inform or advance early childhood practice and/or policy?

Questions may not be appropriate considering the current phase of this project.