Teacher Reflections on Science Investigation In Early Childhood Classrooms

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INTRODUCTION

- Science provides children with the opportunity to develop knowledge about their everyday interactions with their environments and build scientific problem-solving skills.
- Science has been shown to support children's learning across multiple school readiness domains (Nayfeld et al., 2011).
- At kindergarten entry, children's science readiness is lower when compared to other content areas like reading and math (Greenfield et al., 2009).
- Most of preschool teachers' experiences are limited to demonstrations, and they attribute their hesitation to implement science activities to their lack of content knowledge (Timur, 2012; Torquati et al., 2013).
- A better understanding of the science learning environment, teacher attitude, and mindset in an early childhood classroom may contribute to improved children's performance in science processes and content.

Research Question

- What is the association among teachers' use of science materials and activities, their reflections on their practices related to science, and their mindset using a qualitative method?

METHOD

- Qualitative Methods
- Participants: Four preschool teachers located at three child care centers
- Teacher online survey; their attitudes towards science (Maier et al., 2013), their mindset (Dweck, 2006), their classroom environment related to science (Tu, 2006), and their reflections about teaching science
- Teacher interview; further explanation as to their own practices around science topics in their classroom

ENVIRONMENT

Interview

What challenges do you face? *"Getting materials."*

*"Just to get some new and exciting things to make it exciting. So it's not just **the same stuff** everyday."*

"…its hard. Its like you don't really have so much stuff."

*"As far as **money or things that we need we don't always get**."*

"Science area has always been a really tough one for me to get materials for."

*"Maybe if we had the materials that would help. Sometimes when you **don't have the materials** you just **don't plan for it**."*

Survey

Teachers responded to an online survey of items present in their classrooms (Tu, 2006).

Area	Examples
General Classroom	Flashlights, cooking materials, planting materials, magnifying glasses, balance scales, microscope, animals, plants, magnets, mirrors, metric weights, ramps, wooden planks
Sandbox	Pouring items, rocks, pebbles, digging items, stones, sea shells
Water Table	Containers, colanders, funnels, eye droppers, strainers, objects that sink/float
Blocks	Large wooden blocks, large cardboard blocks, ramps, small cars, connecting toys, magnetic blocks

MINDSET

Survey

Teachers responded to 16 questions to determine their mindset related to intelligence and talent (Dweck, 2006)

	Mean	SD	Min	Max
Intelligence	3.18	.26	1	6
Talent	3.44	.22	1	6

1=Strongly Disagree 2=Disagree 3=Mostly Disagree
4=Mostly Agree 5=Agree 6=Strongly Agree

Interview

Growth Mindset Examples:

*"**I want to figure out** ways that I can make it **more of a priority**. Because I like it and I think they like it, too."*

*"I'm not really that great at science. **It's not really my strong point and so I try** to… it's hard for me to get them excited."*

Fixed Mindset Examples:

*"Part of it's me not doing enough of it. You know taking the time to look and **I'm bad at it**."*

ATTITUDES

Preschool Teachers Attitudes & Beliefs toward Science Teaching questionnaire (P-TABS; Maier et al., 2013)

- Teacher Comfort: teachers' comfort level in planning and demonstrating different science activities
- Child Benefit: teachers' attitudes and beliefs toward how science can foster children's interest in science and improve kindergarten readiness.
- Challenges: teachers' negative attitudes and beliefs towards teaching science including their discomfort and concern regarding their ability and amount of time needed to do science activities.

Interview

*"**I have a lot to learn about science**. Yeah, I don't know science is one of those ongoing… um… it's kind of just on the **back burner**. Honestly, you know, **it's hard**. This is really good and needed."*

*"It's fun so like it's easy for me to get the kids excited because **I'm generally excited** about the science experiments, too. I love throwing those big words in there for them and science is a really **easy way** to get some of those **good language things going**, and I'm big on finding that."*

	Mean	SD	Min	Max
Teacher comfort	4.38	.270	1	5
Child benefit	3.85	.21	1	5
Challenges	2.86	.31	1	5

1=Strongly Disagree 2=Mildly Disagree 3=Neutral 4=Mildly Agree
5=Strongly Agree

DISCUSSION

- Teachers connect science with a variety of materials.
- Teachers feel less competent in their science teaching and as a result, rely heavily on the materials to engage and interest children in science.
- Science may be confined to an area of the classroom and less likely to be integrated into other center areas or activities. Teachers recognize the importance of integrating science into other content areas but are unsure how to do that.
- Teachers believe that science is a formal teacher-led activity in which children engage.

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