Examining Strategies to Enhance Preschool Science Instruction

Incorporating science into everyday conversations helps children learn to reason and understand their own thought processes, which has important implications for their long-term success. A powerful way to improve children’s learning is by engaging in science talk. However, preschool teachers in both the U.S. and Brazil express a lack of scientific knowledge and training to confidently integrate science in their classrooms. As a result, many are reluctant to talk about science with their young students. Preschool Science Talk in Action and Reflection (PreSTAR) is a professional development model that aims to enhance preschool science instruction by empowering teachers with tools, resources and a supportive community beyond what is typically provided to early childhood practitioners.

RESEARCH GOALS

• Investigate teachers’ ideas and reflections about using science in the classroom.
• Examine the change in teachers’ reflections on children’s interactions with science-related materials and their practices over time.
• Examine the change in teachers’ attitudes toward teaching science, as well as the how their science talk changes over time.
• Examine the change in children’s science talk, behavior and engagement levels over time.
• Develop a professional development model focused on science talk, including a set of user-friendly forms to help teachers implement reflective practices in early childhood science education.

WHY IS THIS RESEARCH NEEDED?

We need a better understanding of the following to improve children’s science learning and teacher training programs:

• The science learning opportunities provided in early childhood classrooms through materials and activities.
• How those opportunities are associated with the knowledge and skills children gain.
• How teachers intentionally reflect on their practices, as well as any missed opportunities for science talk.

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LOCATIONS

São Paulo, SP, Brazil
• EMEI Ignacio (public school)
• Escola do Bairro (private school)

Lincoln, Nebraska, U.S.
• Two Head Start program sites
• One Kinder Care community child care program site
RESEARCH SNAPSHOT

8 preschool teachers (4 in Lincoln & 4 in São Paulo)
16 reflection sessions* (4 reflections x 4 teachers)
160 children ages 4-5, mostly from low-income families

*Numbers for U.S. teachers only.

PRELIMINARY FINDINGS

Teacher Practice
• Between the U.S. and Brazil, there are more similarities in how teachers plan for science activities than differences.
• How teachers actually initiate and implement science activities seems to be different.

Teacher Reflection
• Although teachers in the U.S. provided significantly deeper levels of reflection as they participated in more reflection sessions, their overall level of reflection was low.
• Teachers in Brazil provided lower-level reflection overall; however, they provided more child-centered reflection as more science-related materials became available.
• The focus of reflection appears to impact the level of reflection, but the association seems to differ between the two countries.

RECOMMENDATIONS
• Further examine how contextual factors are associated with how teachers implement and reflect on their experiences and observations.
• Prioritize adding new science-related materials to the classroom and allow teachers to closely observe what children do with them.
• Offer teachers opportunities to reflect on their observations, interactions and evaluate their teaching practices.

What’s next?
In future studies, we would like to:
• Study how the level of teachers’ reflection on their science teaching changes with a greater number of reflection sessions and how their ability to deeply reflect on their practices changes their actual practices.
• Create a set of professional development resources for teachers using the resources that were developed and used in the pilot impact study.
• Develop a secure website for researchers and teachers that serves as a forum to share journal entries, plans and reflection notes. This online platform will also allow teachers to share information with families.

Brazil preschool site: Activity exploring life science.
U.S. preschool site: Activity exploring the relationship between properties of objects and the distance cars travel.