

# Chapter 10

## NSF–Funded Exploratory Study: Lessons Learned

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### **ABSTRACT**

*In this NSF-funded exploratory study the author examined the impact of professional development on NGSS teaching of administrator-selected teachers in a large, urban, public school district in the United States. Currently, the research literature on professional development about NGSS in early grades about NGSS is sparse. Thus, the purpose of the study was to develop and implement a professional development program for Early Childhood and Elementary in-service teachers with the aim of understanding its impact on their knowledge for NGSS teaching and classroom practice. Findings from self-reports revealed improvement in teachers' knowledge for NGSS teaching particularly in the domains of lesson planning, classroom teaching, and classroom assessment. Lessons learned from the exploratory study for future professional development in professional development for NGSS teaching and learning are discussed.*

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## INTRODUCTION

Two major reports, *the Framework for K-12 Science Education* (National Research Council, 2012) and the *Next Generation Science Standards: For States, By States (NGSS Lead States, 2013)*, call for science teaching that is focused on the intersection of disciplinary core ideas, cross-cutting concepts and science and engineering practices. The Framework also envisions science learning as involving students' engagement with disciplinary core ideas and crosscutting concepts in the context of science and engineering practices. This shift in perspectives of teaching and learning will require models of professional development that help teachers acquire the knowledge and skills for teaching as envisioned by the Framework and NGSS. In early childhood education, the issue of high-quality science instruction is particularly challenging given the observations that many early childhood teachers are not well prepared to teach science in the early grades nor is pre-school and early childhood science education perceived as the foundation for later achievement of high-quality instruction. However, to date, the research literature is sparse on the kinds of learning experiences that support teachers in designing and implementing science integrated lessons in ways that build science literacy for early childhood learners as envisioned by NGSS. In recent years, however, models for teacher professional learning have provided some guidance for improving teacher knowledge for science teaching and learning at the elementary and early childhood level called for by the Framework. Among the design features that proven effective in prior research of professional development to enhance teacher and student learning in STEM disciplines include: targeted topics and strategies of relevance and importance to early childhood educators (Garet, 2001); provide opportunities for hands-on practice and reflections (Spillane, Reiser and Reimer, 2002); active participation and collaboration in the design and implementation of classroom activities (Penuel, Gallegar, & Moorthy, 2011); sufficient dose over a sustained period (Yoon et. al, 2007).” Gaining insights on how teacher improve knowledge and practice through professional development will provide key information about how resources should be directed to childhood programs for supporting pre- and in-service teachers to develop NGSS-based knowledge and skills for teaching.

In the proposed chapter the author will share anecdotal stories of an NSF-Funded exploratory study, *Facilitating Teachers, and Young Children's Science learning through Iterative Cycles of Professional Development*. One of the goals of that study was that teachers participating in the professional development program will gain knowledge and skills consonant with NGSS expectations for teaching.

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