National Science Foundation – DR – K12
PI Meeting
August 4-5-6, 2014
Washington, DC

PERSPECTIVES FOR ADVANCING THE EFFECTIVENESS OF ELEMENTARY SCIENCE INSTRUCTION FOR STUDENT LEARNING: IMPORTANCE AND CHALLENGES

A SYMPOSIUM

Presenters

- Ala Samarapungavan (PI) and Lynn Bryan (Co-PI) – Purdue University
- Carolyn Staudt (PI) -The Concord Consortium

- Michael Vitale (Co-PI) – East Carolina University
- Nancy Romance (PI) – Florida Atlantic University
- Annemarie Palincsar (PI) – University of Michigan

- Hilda Borko (Co-PI) – (with Jonathan Osborne) Stanford University
- Deborah Hanuscin (PI) – University of Missouri

Symposium Overview

- Our goal is to have an *open discussion* that contributes toward our understanding and identification of key components and models that result in quality elementary science teaching and desired student achievement outcomes
- What *unites* all of our projects is this broad goal yet we may each use differing instructional tools and models to reach the goal
- While there are some *overlapping features* across our projects, there are interesting ways in which each project emphasizes particular components or integrates components. So……
- Presenters will highlight those *key components (levers) for change* that our projects address, the underlying design framework, and findings, if applicable

Symposium Overview - How the Panel will Work

- *Panel presentations* are clustered around three broad-based themes (*Models and Modeling*; *Curriculum and Instruction*; *Professional Development*)
- 2 panel members from each cluster will each use *5-7 minutes* to highlight their project
- Audience will then have 5-7 minutes to comment and/or direct questions after each cluster of presentations
- Key ideas from the discussion will be noted by a scribe
- Goal: Report ideas and research findings resulting from the Symposium as the beginning of a process to bring elementary science to the forefront for STEM researchers, Practitioners and NSF

Models and Modeling

Presenters:

Ala Samarapungavan and Lynn Bryan

Purdue University

"*Modeling in Primary Grades: Science Learning through Content-Rich Inquiry*"

Carolyn Staudt

The Concord Consortium

"*Sensing Science: Heat and Temperature Readiness for Early Elementary Students*"

Models and Modeling – Sample Questions

1. How do people learn science from childhood to adult? How do we develop a cumulative model of learning expectations as children move from grade to grade?

2. How can conceptual models and modeling processes support in-depth learning?

3. How does use of a model-based inquiry format support early elementary students learning of physical science?

4. How can our efforts to improve STEM opportunities for young children be informed by research on development (i.e., cognitive development, language development, literacy development) and how can our work, in turn, inform these domains of study?

Educative Curriculum Materials and Instruction

Presenters:

Michael Vitale

East Carolina University

"An Integrated Instructional Model that Links Science and Literacy in Grades 1-2"

Annemarie Palincsar

University of Michigan

"Designing and Investigating Educative Curriculum Materials to Support Science Literacy in the Elementary Grades"

Educative Curriculum Materials and Instruction Sample Questions

1. What are the features associated with educative curriculum materials that support teachers' knowledge and practice for teaching young children science well?
2. What role does ELA play in supporting the science learning (and language development) of young children?
3. What are key aspects of an integrated instructional model that support classroom practice and student learning outcomes?
4. Can linking science and Literacy impact outcomes related to comprehension, writing/journaling, classroom discourse?
5. How can we support districts and teachers in framing their standards-based curriculum into one that reflects the key dimensions identified in the NGSS?

Professional Development

Presenters:

Hilda Borko (in collaboration with Jonathan Osborne)
Stanford University
"*Researching the Efficacy of the Science and Literacy Academy Model*"

Deborah Hanuscin
University of Missouri
"*Quality Elementary Science Teaching*"

Professional Development – Sample Questions

1. What are the key attributes of effective professional development that can effectively guide teacher practice and support desired student learning outcomes?
2. What kind of knowledge do teachers need to provide quality elementary science experiences for children?
3. How can we support teachers in using productive disciplinary conversations that result in deepening their understanding of the core ideas as presented in the NGSS?
4. How can we maximize teachers' effective use of curriculum resources, models and technology to support meaningful learning for all students?

Student Learning is at the Heart of Our Work