

Plymouth State University
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Teacher as Researcher

Project Abstract:

Students who study science early on are better equipped to handle scientific issues facing our world in the future. Land use and development, availability of energy and mineral resources, water resources and quality, preservation of wetlands, erosion, waste management, pollution remediation and geological hazards are just a few of the issues that will require deep scientific knowledge, creative thinking, and unique solutions to resolve. Students who are familiar with these issues and have developed problem-solving skills through quality science experiences and instruction may be able to deal with these problems as adults. If we want high school and college students to study science, we need to start by teaching them when they are in elementary school. We cannot expect an older student to understand the complexities of biology and chemistry if they were never given a foundation of science education at a younger age.

To do this, young students must have had opportunities to work with teachers who can facilitate and develop their scientific thinking skills and abilities, focusing especially on inquiry-oriented methods. To effectively teach science through inquiry, a teacher must have a strong understanding of the inquiry process and have had opportunities to conduct projects through an inquiry-based approach. Two significant components of effective science instruction at all education levels are (1) a teacher's strong science content background, including a solid understanding of the scientific or inquiry process, and (2) teacher self-efficacy in teaching science. To sufficiently effect district level change that benefits children's academic outcomes, a teacher must have a strong understanding of the research process and have opportunities to conduct research in meaningful ways. In general, K-5 teachers do not possess these traits and therefore face significant obstacles to effectively teach science to their students, assess the impact of their teaching and make needed modifications to improve their teaching.

Combined, these factors translate into a need to plan and design more content-rich, inquiry-based professional development opportunities that empower teachers to conduct action research in order to change their instructional practice and improve student performance. Changing beliefs on how and what can be effectively taught to children is the first step in changing classroom practices and allows teachers to become content competent and process competent. Our Teacher as Researcher project will service 36 teachers and 375 children over 18 months from the Newfound School District (NFSD). Teachers will come from the K through 5th grades in each of the 4 elementary schools that are serviced by the NFSD.

The project will provide (1) embedded professional development through monthly content-rich workshops, with a focus on K-5 requirements as outlined in the New Hampshire Frameworks targeting the recognition and understanding of learning progressions, (2) technical and instructional assistance in the development of inquiry based curriculum utilizing science progressions and in the design of authentic assessments to benefit inquiry approaches with K-5 children that are geographic and culturally relevant to the schools represented in this project, (3) mentorship in the application, implementation, and analysis of systemic action research and (4) collaborative publication and presentation opportunities.