

OUTCOMES AND IMPACTS | DRK-12 RESEARCH ON RURAL K-12 STEM EDUCATION

These descriptions of project outcomes and impacts were derived from project outcome reports (PORs) submitted to NSF at the conclusion of the associated DRK-12 projects.

Persistence of Teacher Change in Rural Schools: Assessing the Short- and Long-term Impact of Professional Development on K-2 Science Instruction (PI: Cathy Ringstaff)

This research found that professional development had a positive impact on K-2 elementary teachers' science content knowledge, self-efficacy, instructional time devoted to science, and instructional practices in science, but without ongoing support, these changes began to decline two years after the professional development ended. The study also found that contextual factors across schools and districts influenced instructional time in science and teachers' use of instructional strategies, as well as that teachers' most frequently requested forms of support were modest. These findings contribute to the research literature on science instruction in the early elementary grades and on the long-term effects of professional development, and hold practical implications for designing professional development programs, addressing potential obstacles to K-2 science instruction, developing policies that support teacher change, providing essential resources and instructional support for teachers in rural communities, and improving education for students in underrepresented groups. [Read more.](#)

Researching the Expansion of K-5 Mathematics Specialist Program into Rural School Systems (PI: Aimee Ellington)

Through this project, a preexisting master's program was redesigned to allow access in remote areas of Virginia. Twenty teachers graduated with a master's degree and achieved the mathematics specialist endorsement to their teaching license, and served two years as mathematics specialists in their respective school systems. A control-treatment design was utilized to study the impact of elementary mathematics specialists on student achievement in rural school districts, which found a positive impact for those students whose teachers were highly engaged with a specialist. The findings suggest that the design of coaching initiatives and policies should focus on establishing a collaborative environment that permits and supports professional interaction and coaching in order to produce positive instructional change. [Read more.](#)

Science, Technology, Engineering and Mathematics Teaching in Rural Areas using Cultural Knowledge Systems (PI: Lynda McGilvary)

The STEM TRACKS project has successfully developed and tested a process model guiding coproduction of place-based K-12 education resources for a rural Alaska school district with over 90% Indigenous students. The project has resulted in a finalized Alaska-based curriculum called "Qanniksuq: It is Snowing" that contains nine hands-on lessons, five educational videos, and an online I?upiaq pronunciation guide, as well as a pedagogical guide to Cultural Connections curriculum. This project has strengthened relationships between UAF and the rural community, and provided Alaskan learners with

educational materials that represent themselves. It has also been used as the basis for a new project that explores the transferability and sustainability of resources created using the CCPM. [Read more.](#)

Synchronous Online Professional Learning Experiences for Middle Grades Mathematics Teachers in Rural Contexts (PI: Jeffrey Choppin)

The SyncOn for Teachers project designed and implemented a three-part fully online professional development model for middle school mathematics teachers in rural contexts, mainly in Idaho and western New York. The project generated 10 publications and 31 presentations at major domestic and international mathematics education conferences. The findings showed that coaches were able to compensate for the lack of in-person contact, the online environment posed minimal constraints, annotations of the videos of teachers' lessons provided insights, coaches' and teachers' characteristics impacted the coach-teacher relationship, and the content of the coaching cycles had an outsized role. [Read more.](#)