

Rural STEM Education: Telluride Regional Case Study



BACKGROUND

In the 2015-2016 school year, the Colorado Education Initiative (CEI) supported the creation and expansion of STEM career pathways in two Colorado regions with support from JPMorgan Chase, the Women's Foundation of Colorado (WFCO), and the Colorado Workforce Development Council (CWDC). Delta School District and Poudre High School were awarded grants to increase the number of underrepresented students in their STEM career pathways. Each district tailored their approach to support their community's specific needs.

Building on the success of these efforts, and a growing interest across the state in expanding and improving STEM education, WFCO supported CEI's proposal to document how the rural Telluride region was implementing a unique pilot focused on STEM education.

Also in 2015, staff members from CEI, CDE, and the Gill Foundation were invited to participate in the Telluride Foundation's listening tour of the Uncompahgre BOCES region, which serves five school districts: Norwood, Ouray, Ridgway, Telluride, and West End (Naturita Elementary, Nucla High School, and Paradox Valley Charter School). Student populations in these districts range from 220 to 780 students. The tour included conversations with superintendents, teachers, and community partners about opportunities and challenges related to STEM education. The Telluride Foundation was particularly interested in uncovering possibilities for increasing the number and diversity of students eligible for the Neil Armstrong STEM Scholarship Fund, which honors the achievements and character of Neil Armstrong through scholarships awarded to youth pursuing a degree in science, technology, engineering or math. Historically, it has been challenging to find academically eligible applicants with diverse backgrounds from across the region.

Throughout the listening tour, educators expressed the lack of time and capacity available to align content areas and incorporate rigorous, project-based learning practices into an authentic STEM curriculum. In response, the Telluride Foundation worked with superintendents and the Uncompahgre BOCES to fund a STEM coach who would be available part-time throughout the 2016-2017 school year.

CEI bolstered this effort by sharing resources and making connections with partners in the region. During the 2016 CEI Showcase, CEI invited additional partners, including CWDC, to formalize a plan for continued support. In June 2017, CEI staff returned to the Telluride region and visited with superintendents, principals, and teachers in the region, and captured some key lessons learned about STEM education in the region and the STEM coach model.

OBJECTIVES

The purpose of this report is to highlight some key components of STEM education strategies in the Uncompahgre BOCES region in order to inform and inspire work in other rural regions across the state. Specifically, this case study will:

- Explore the context of STEM education in this region;
- Examine the burgeoning apprenticeship and internship work in the West End School District; and
- Detail the impact of the STEM coach model in the region.

KEY TAKEAWAYS

Several common themes were echoed among educators in the region. Community partnerships, advanced placement courses, concurrent enrollment, work based learning (internships and apprenticeships), curriculum, and professional development were highlighted as the fundamental elements that support strong STEM education.

Community Partnerships

Each district indicated that community partnerships are a vital component of their work. The West End School District engages the community early and often to build support for concurrent enrollment options, internships, capstone opportunities, and apprenticeships. Telluride School District has developed several key community partnerships, including a collaboration with the Pinhead Institute, a local nonprofit that provides high-level scientific education in rural Colorado.

Advanced Placement Courses and Concurrent Enrollment

When discussing STEM education and pathways for students, advanced placement and concurrent enrollment courses were central considerations in each district. Many districts expand course options for students through online courses.

While beneficial to students, these strategies present some challenging factors. Obstacles include the variations in course fees for community college partners, internet connectivity and access to online courses, and teacher licensure.

Teacher Shortage

Rural areas commonly face a shortage of teachers with the certification and licensure to teach advanced courses. Teacher shortage and retention were repeatedly identified as a challenge, particularly in STEM subject areas. Attracting highly qualified teachers is difficult when limited budgets dictate lower salaries, and high housing prices exacerbate the problem.

Districts expressed interest in pursuing a co-teaching model, citing instances of highly-qualified retired or part-time professionals who partner with schools to provide instruction. The region's school districts are still seeking a way to comprehensively leverage these individuals across their systems.

Work-Based Learning - Internships and Apprenticeships

Districts vary on existing opportunities for work-based learning for students.

Ridgway offers a variety of experiential and service-learning opportunities for students. West End School District has a vision for continuing to build its internship program and, eventually, an apprenticeship program. The district launched an internship and capstone program with local businesses, yet struggled to find opportunities in the fields in which students were interested. However, despite this limitation, the program has garnered positive feedback, especially among students, who report that the internship and capstone experience has helped them become more engaged in their education.

Curriculum and Professional Development

Each district stressed the importance of quality curricula and professional development opportunities. Some districts are working on vertical alignment of curriculum in core content areas such as science and math. Some are investigating new curricula options in response to feedback that educators are dissatisfied with current options.

Finding quality and affordable professional development is a common theme, with a desire for easier access to instruction focused on problem-based learning practices and rigorous STEM content. A clear need exists to increase time for teacher planning and peer learning, along with additional training on data-driven decision making.

Some teachers expressed a lack of access to relevant resources and project ideas to engage students. They also referenced the need for supplementary tools to be aligned to standards, and the difficulty in creating them from scratch.

STEM COACH PILOT

The Uncompaghre BOCES launched a STEM coach pilot in the 2016-2017 school year, modeled after a previous, similar effort with a BOCES math coach. The BOCES and area superintendents hired a part-time coach to support the region's districts with STEM education, funded in part by the Telluride Foundation. This STEM coach pilot was a great learning opportunity and showed that there is interest in STEM coaching in the region.

Recruitment and Hiring

Superintendents and principals were invited to weigh-in during recruitment and hiring of the STEM coach. Each district had slightly varied expectations and needs, and as a result, finding the right candidate was difficult. The application window remained open for longer than expected, increasing the time involved to fill the position. It was hypothesized that significant time and travel requirements and the part-time nature of the position may have discouraged potential applicants.

In the future, partners recommend including multiple representatives from each district, including teachers from the onset and continuing throughout the hiring process. This will ensure full incorporation of teacher needs and voice, and reduce the lack of alignment between teacher expectations and candidate qualifications.

District Needs

Each district has a unique vision and approach to STEM education and therefore has unique needs from a STEM coach. Some districts sought assistance with cross-curricular or vertical alignment, others were looking for coaching and pedagogical support, and still others wanted resources and supplemental resources to enhance classroom learning. It's no surprise that the STEM coach was accessed differently at each district; some relied heavily on the coach for support while others did not engage at all.

It's difficult for one person to meet the needs of all districts, schools, and teachers. A suggestion to offer more than one STEM coach with a variety of areas of expertise is valid, although this is an expensive solution.

Coach Expertise and Logistics

Selecting a STEM coach with capabilities to meet the needs of each district was the fundamental challenge. Some districts engaged in deep coaching and teacher feedback to support lesson planning and execution. Teachers in other districts leveraged the experience of the coach to improve and increase supplemental content resources. The variation in requests of the coach, combined the amount of travel and part-time nature of the position, stretched the coach's ability to be responsive to the needs of each district equally.

Buy-in and Support

The underlying takeaway from the STEM coach pilot and is the need for buy-in and support from all stakeholders. Specifically, conversations in the planning phase should address:

- A needs assessment from each participating school;
- The qualifications required of a coach to be able to meet those needs;
- How districts and schools will access and engage the STEM coach; and
- The types of expertise and support the STEM coach will be asked to provide.

The success of the coach also relied on personal relationships with individuals. The BOCES is a trusted resource and broker, yet teachers and superintendents were hesitant to engage unless they had an aligned, specific need.