Nevada Statewide Partnership Impacts STEM Learning & Workforce Readiness

Background

The Nevada State Department of Education, with support from Nevada Gold Mines (NGM), partnered with Discovery Education to provide equitable access to high quality, standards-aligned resources through Discovery Education Experience and professional development to all schools, teachers, and students across Nevada. Nevada Gold Mines joined Discovery Education's STEM Careers Coalition (SCC) In an expansion of NGM's leadership in education in 2022. The SCC is a national initiative that aligns cross-sector leadership to support high-quality STEM teaching and learning with a focus on career awareness and exploration for communities traditionally under-represented in STEM fields.

Investments in education have immediate impact, and long-term gains, for the communities supported.
As we entered the third year of the Nevada DOE/Discovery Education/Nevada Gold Mines partnership, we aimed to understand through research the effectiveness of the implementation. As part one of a two-part approach, a third-party pilot research study was conducted from January 2023–June 2023, focused on three Nevada school districts (Douglas County, Elko County, and Washoe County).

The pilot research study collected data at various points during the school year via teacher and student surveys, teacher classroom observations, and teacher focus groups. This pilot phase will be used as a foundation study leading into next year, allowing for timely implementation and a larger research cohort for an ESSA Tier 3 study* in 2023–2024.

This pilot study was commissioned to provide deeper research in support of the program's original key performance indicators (KPIs), which have all been reached and exceeded to date:

Improved Teaching Practices/KPI 1 Result: 87% of teachers surveyed who attend professional learning report they can apply instructional strategies from the professional learning sessions in their classroom (initial benchmark was 85%).

Increased Student Engagement/KPI 2 Result: 90% of teachers surveyed agree that Discovery Education provides high-quality content that increases student engagement in learning (initial benchmark was 75%).

Increased Interest in STEM Learning/KPI 3 Result: 80% of teachers in STEM surveyed report that after using DE STEM content, students are more likely to be interested real world STEM connections and career pathways in STEM fields (initial benchmark was 70%).



Insights

Study results show an initial positive relationship between teacher and student use of Discovery Education Experience (digital learning platform), particularly deeper engagement and student interest in STEM and STEM careers. Further, data supports indicators for positive impact during the study's next phase. Select data points are below, including quotes from focus groups and surveys.

- **Teachers highly agree that Discovery Education's resources are useful** with a construct average of 4.77 on a 5-point scale.
- Nearly **90% of teachers agreed or strongly agreed that the Discovery Education resources increased student interest in STEM topics and careers**.
- Nearly **90% of teachers either agreed or strongly agreed the resources helped them apply the 4Cs** (Collaboration, Communication, Critical Thinking, Creativity) to their instruction which helps students build 21st-century skills to strengthen the future STEM workforce.
- Over **80% of teachers agreed or strongly agreed that their interest in STEM had grown** as a result of using the resources.

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- **Teacher awareness on the STEM Careers construct was statistically significant** (increased from the beginning of the pilot study to the end). Teachers increased their knowledge of where to find resources for teaching students about STEM, learn more about STEM careers, and where to direct students and parents to find information about STEM careers.
- The **Personal Teaching Efficacy and Beliefs Construct scale** revealed that teachers provided high ratings on all items at the end of the pilot. Teachers increased their understanding that there are multiple STEM career pathways, and increasingly believe:
    - STEM can be engaging and fun for everyone.
    - STEM teaching and learning can be for all learners.
    - School districts and communities should invest in STEM.
- **Teacher feedback on surveys and focus groups was also extremely positive**. Teachers liked having resources that were accessible and that they could trust, and encouraged other teachers to use them, and saw positive potential of a longer study. For instance, teachers shared the following:

> "I could take things that they already have and also combine it with something that I needed for myself, like throwing in the video with one of the response activities that they suggested from the training was really helpful."

> How much it can help them [teachers] to support what the admin are trying to do in terms of rigor and scaffolding and creating engaging content and moving away from using the textbook all the time.

Initial Student Feedback

- Teachers reported higher student engagement when students used the resources.
- Students indicated an increase in positive attitudes and confidence in Math at the end of the pilot study through the S-STEM survey. For both the science and engineering/technology ratings, student's attitudes and confidence remained steady throughout the school year, with an opportunity for gains in the longer study.
- **Discovery Education's resources were used to broaden students' knowledge of STEM careers,** with students reporting they **are most interested in careers in Engineering and supported** by the following focus group excerpts:

> There's just so much on there, like the STEM careers and the virtual field trips, that's engaging in itself. They see themselves in those careers or those videos.

> I used the Careers Channel and it was talking to the kids at the beginning about what kind of STEM careers. And you know, at first it's just like doctor, and we're like OK, like can we make some categories maybe and think about what might come under these different categories. And I think they were like really, really surprised by the amount of different things that are out there.

Results

These healthy indicators and initial feedback from the research, paired with the program exceeding all KPIs, show positive progress of the partnership between the Nevada State Department of Education, Nevada Gold Mines, and Discovery Education. Looking forward, the team will incorporate the feedback provided within the teacher surveys and feedback sessions to continue to enhance implementation and strengthen results as we begin the second phase of the research study.

ESSA is the Every Student Succeeds Act (2015), reauthorizing the Elementary and Secondary Education Act—the United States education law (previous version was No Child Left Behind, 2002). ESSA puts greater focus on evidence-based practices and improvement of outcomes. There are four ESSA Tiers: Demonstrates a Rationale (4), Promising Evidence (3), Moderate Evidence (2), Strong Evidence (1). ESSA Tier 2 requires a well-designed and well-implemented quasi-experimental study design (i.e., intervention and control groups) with minimum of 350 participants (e.g., students), involving at least two sites (e.g., districts).

Student Attitudes Toward STEM (S-STEM)—Upper Elementary (4–5th) and the Middle/High School (6–12th)—Surveys are intended to measure changes in students' confidence and efficacy in STEM subjects, 21st-century learning skills, and interest in STEM careers. The surveys can help educators understand student beliefs in STEM and can assist program coordinators in making decisions about possible improvements to their program. Teacher Attitudes Toward STEM (T-STEM) Survey is intended to measure changes in teachers' self-efficacy for teaching, their belief that teachers affect student learning, how often students use technology, how often they use certain STEM instructional practices, their attitudes toward 21st-century learning, their attitudes toward teacher leadership, and their awareness of STEM careers. The surveys help program coordinators make decisions about possible improvements to their program.