

impact

University of Idaho Extension programs that are making a difference in Idaho.

Mobile makerspaces reduce barriers to STEM education

AT A GLANCE

A fleet of mobile makerspaces is extending Idaho's educational reach to youth audiences in out-of-school and in-school programs, building trained STEM educators and hands-on learning.

The Situation

STEM (science, technology, engineering and mathematics) programming is often limited in delivery due to communities lacking four resources: funding, qualified/trained staff, time and curriculum. Additionally, schools' emphasis is often placed on improving test scores, opening up challenges on how to introduce other subject matter.

Our Response

Think Make Create (TMC) Labs is a mobile makerspace program through a partnership between the University of Idaho Extension 4-H Youth Development and the Idaho Out-of-School Network. The program is focused on reducing the four barriers commonly found to STEM education.

Sixteen 7' x 14' utility trailers, with the interiors built out, transport, and store educational materials and supplies for hands-on, low-tech STEM learning activities supporting experiential learning. Recognizable and familiar supplies ensure a financially feasible way for programs to provide consumable materials and encourage educators and youth to participate in STEM programming simply because the materials are familiar.



TMC Labs pilot trailer with youth participants from Kids City Afterschool Program, Taft Elementary School, Boise.

Community youth organizations are selected to host a TMC lab based on need, audience and occasionally location. Each TMC lab host is provided a fully stocked educational trailer with at least 55 activities for groups of 30 youth. Upon delivery, hosts, educators and community partners receive about six hours of training on how to use their lab, what constitutes quality STEM education, and how to conduct quality STEM programming. TMC lab STEM education address four components: the learning environment, engagement and participation, science content and practices, and youth development.

Program Outcomes

Over six months, 13 trainings were held for 129 participants, and 16 Think Make Create Labs were delivered.

Each training focused on:

- Using Dimensions of Success to create quality STEM learning environments
- Support and inclusion of science standards
- Building confident educators in delivering STEM programming
- How TMC hosts and educators could engage and connect with the statewide TMC Labs network.

Over half (56%) of the training participants had little to no experience leading STEM activities. Therefore, we introduced the Dimensions of Success (DoS) to increase their understanding of what makes a quality STEM program. These 12 standards encompass a quality STEM learning environment developed by the PEAR Institute. This provided a strong foundation for all educators, especially novices, to refer to when facilitating STEM education.

Training participants included formal and in-formal educators. However, 80% of learning happens outside of school. Therefore, training was essential on how formal and in-formal education can use the same educational language and terminology. This language is gleaned from 3 Dimensional Learning, which helps youth do science and build sciences skills and practices. The Idaho State Department of Education co-taught in all TMC Labs trainings. Their teachings combined 3 Dimensional Learning and Experiential Learning and how educators, from any background, could support STEM education by emphasizing phenomena and cross-cutting concepts. Evaluations showed that 90% of training participants plan to support and

include science and standards in their STEM programming.

Also included in the training were hands-on activities, which taught participants how to ask open-ended questions or how TMC activities could be integrated with other subject matters. As a result, 85% of participants felt confident in delivering STEM programming. Participants were also able to walk through and explore a TMC lab, and access Idaho Think Make Create Labs resources and statewide network. Over 90% of participants knew where to engage with TMC Labs for program support and networking with the training complete.

The Future

Continued professional development will be essential to support those hosting and using the Think Make Create Labs and increase qualified and knowledgeable educators on how to deliver quality STEM programming.

It takes effort to build and maintain community partnerships for a program that will be accessible and available to any youth in need. The STEM Education training puts all educators (formal and in-formal) on a successful path supporting youth learning science, technology, engineering and math. An educator's comment shares the promise of more great things to come:

- "Super excited to be chosen to gift children with fun and learning. I'm creating scientists, engineers, mathematicians and techies. We are going to rock this!"

FOR MORE INFORMATION

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