

Girls in Science, Technology, Engineering, and Math: From Camps to Careers

Abstract

Science, technology, engineering, and math (STEM) careers are among the fastest growing and highest paying, yet women are largely underrepresented in these fields, and many girls lack access to STEM opportunities in school. Oregon State University's Open Campus partners with the American Association of University Women to bring an experiential STEM camp, Tech Trek, to middle school girls in rural Oregon with the ultimate goal of increasing the number of women in STEM. Tech Trek serves as a model for intentionally engaging youths to expand access to career opportunities that can be adapted for other Extension programming.

Keywords: [youths](#), [STEM camp](#), [women in STEM](#), [college and career access](#), [college and career readiness](#)

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Introduction

Science, technology, engineering, and math (STEM) careers are among the fastest growing and highest paying in the United States (American Association of University Women, 2010). Yet STEM careers are still dominated by men, particularly computer science (26% female) and engineering (12% female), meaning that many women are excluded from these opportunities (American Association of University Women, 2015). Research has shown that females and males perform similarly in STEM courses from kindergarten through 12th grade (K–12) and in college, but girls start to lose confidence in STEM around middle school (American Association of University Women, 2010), a circumstance that steers them away from the more rigorous coursework needed in high school and college to successfully enter the STEM workforce.

STEM camps designed to target girls during their middle school years are one important intervention to keep girls engaged with STEM (e.g., Hughes, Nzekwe, & Molyneaux, 2013; Levine, Serio, Radaram, Chaudhuri, & Talbert, 2015). In this brief, we share how the elements of one such camp, Tech Trek, can be applied to intentionally design girls' STEM camps with the ultimate goal of increasing the number of women in STEM careers. Tech Trek was created by a branch of the American Association of University Women

(AAUW) and developed into a national AAUW program in 2013. Through Oregon State University (OSU) Extension's Open Campus, Oregon has two sites as part of this national camp initiative. Local developers of each camp are responsible for logistics, including camper selection, volunteer management, camp curriculum, and fundraising.

In addition, we highlight the role of Open Campus in the camp planning process. Open Campus, a program under OSU's Extension Service since 2009, is a community-based education partnership that centers on career and college access and community development. Open Campus employees are housed primarily in rural community colleges and K–12 school districts around the state to promote partnerships that address the unique educational needs of each community. The goals of Open Campus and Tech Trek align closely: to promote equitable student access to college and careers.

Key Elements and Community Partnerships

Our Oregon Tech Trek camps are weeklong residential STEM camps. Camp planning and logistics are handled through the main partnership between Open Campus and AAUW, and each camp is partnered with a college or university as the host campus.

AAUW Required Elements

- The camp format is a weeklong overnight experience on a college campus with daily 3-hr STEM core classes for in-depth engagement, daily 1-hr workshops that allow for shorter interactions with a wider breadth of topics, a daylong STEM-focused field trip, and a professional STEM women's night during which campers learn about STEM careers from women in these fields.
- Seventh-grade girls are nominated by their STEM teachers and complete an application before being selected to attend the camp. The cost to campers is \$50 for the week to keep the camp accessible, with a true cost of approximately \$600 per camper.
- All volunteers must identify as women, including teachers, workshop presenters, professional STEM women's night participants, dorm monitors, and other camp staff. Studies have shown that women role models in an educational environment build girls' positive associations with STEM subjects and increase their motivation to pursue STEM careers (e.g., Stout, Dasgupta, Hunsinger, & McManus, 2010; Wang & Billington, 2016).

Unique Elements and Community Partnerships

- The Oregon camp planning committees include representatives from Open Campus, the local AAUW branch, nonprofits, K–12 school districts, and the host campus (coastal camp—Tillamook Bay Community College; central camp—OSU—Cascades). These partnerships leverage resources and connections that have resulted in a larger and more diverse set of volunteers and greater access to resources (such as school district buses for field trip transportation).
- We focus recruitment on girls from rural communities, recognizing that rural students have lower college-going rates than their suburban and urban counterparts (National Student Clearinghouse Research

Center, 2016) and have less access to STEM electives (Google Inc. & Gallup Inc., 2017) and advanced placement courses (Gagnon & Mattingly, 2016).

- For our professional STEM women's night, we incorporate a range of local women STEM professionals, including Extension faculty (representing agriculture, forestry, and public health), engineers, computer scientists, environmental scientists, medical professionals, and more. Rather than presentations, we hold a "speed dating" style event where campers spend time with each professional in small groups. The campers are prepared to ask in-depth questions through a workshop on professionalism held earlier in the week.

Summary

Since 2014, we have served over 250 rising eighth-grade girls from rural communities around Oregon. Our campers have expressed increased interest in STEM college majors and careers following their experiences at the camp. This increased interest manifests nationally as well, with former Tech Trek campers being more likely to take advanced high school math courses when compared to their peers (77% of Tech Trek alumnae versus national average of 37% [American Association of University Women, n.d.]). As the first cohort of Oregon campers graduate from high school, we also are seeing college-going rates that far exceed the state average (89% of Oregon Tech Trek alumnae versus Oregon average of 62% [Oregon Department of Education, 2019]), with a third of this cohort now attending OSU. In addition to these camper outcomes, we partnered with over 200 volunteers and raised more than \$200,000, which allows us to provide high-quality camps annually at a low cost to campers and to spend much of these funds in the rural communities where the camps are held. The partnership with AAUW has leveraged national, state, and local resources and is a prime example of how Extension can partner with nonprofits to achieve complementary goals.

Another benefit of Tech Trek is the opportunity to engage with youths who may not have previously participated in Extension programming. Through a program such as Tech Trek, we can provide a platform for sharing more details about Extension through workshops, field trips, and the professional STEM women's night. We believe this model can be used by other Extension programs to develop high-quality, intentional STEM programming for youths that addresses local education needs, contributes to workforce development, and combats inequities.

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