

Science Foundation Arizona (SFaz)

Background

Over a period of several years, Science Foundation Arizona (SFaz) has successfully partnered with key leaders to establish the Arizona STEM Network to drive access to effective STEM education for all Arizona students by creating a culture of achievement. As part of this work, SFaz has led a number of projects focused on implementing and sustaining Engineering Pathways, a model that links student experiences across education sectors (K–12 through postsecondary) to engage and excite students about STEM career opportunities, prepare students for rigorous college coursework, and support acquisition of meaningful career knowledge and skills leading to program degrees and credentials, and completers performing in the workplace.

SFaz initially partnered with Cochise College, using SFaz and National Science Foundation’s Advanced Technological Education (ATE) funding, to more fully develop its Engineering Pathway into a proven model. Over a period of time, Cochise College has introduced strategic activities/programs across the Pathway Model, including:

- Career Exploration
 - Math/Science Experience (4th–8th grades): A one-day, on-campus experience with 50 organizations serving 1,160 students in 2011.
 - STEM Exploration (9th–10th grades): Four days of targeted activities enrolling 46 students during 2010–11, up from 40 the previous year.
 - Classroom speakers and university visits (11th–12th grades): 12 classroom presentations, with 30 – 35 students visiting Arizona State University (ASU).
- Math Education
 - Summer Math Academy (7th–8th grades): On-campus summer camp for students improving math skills, with 29 students in summer 2011.
 - ITV Consortium Math Outreach: Using technology to connect college with local high schools to support offering of Pre-calculus and Calculus I courses to high school students, with 12 students enrolled in 2011–12, up from 10 the previous year.
 - Professional Learning Council: Instructors/support staff from across education sectors participating in research-driven inquiry focused on improving student success in math and along the Engineering Pathway.
- Early College
 - Running Start Academy (RSA): On-campus early college experience for “ready” high school students focused on engineering (technical and transfer) courses and targeted student support strategies. Initial high school junior enrollment in the RSA program in fall 2011 was 35 students, double the enrollment compared with fall 2010. Female enrollment was also up to 55% from 28% in the prior year.
 - Industry engagement to support curriculum development and provide meaningful intern opportunities for high school students.
 - Curriculum opportunities include traditional and hands-on learning around preparation of future engineers and/or technicians.
- Transfer Education
 - Established STEM degree pathways with universities.
 - Member of ASU’s Motivated Engineering Transfer Students (METS) program, funded by the NSF, to support community college/university transfer students in engineering.

- Industry engagement to support curriculum development and provide meaningful intern opportunities for college school students, with eight students interning at a local technology company in a pilot program for summer 2012.

Preliminary Results

Junior and senior high school students qualify for the Running Start Academy through a math placement test at the college and are able to earn between 40 and 42 transferable college credits during their two years in the program, leaving them just 20 to 22 credits short of an associate of science degree in engineering. Findings over the course of two academic years show very strong student support for the quality of the program, and 87% indicated an interest in a STEM field of study. A follow-up survey in October 2011 of May 2011 Running Start graduates showed that of the 13 that responded, all were attending college either at Cochise College in a two-year program or at a university in a Baccalaureate degree program. Over 90% identified themselves as currently enrolled in a STEM major.

The applied technology program at Cochise College is a four-course program developed by Siemens Corporation offering students hands-on electro-mechanical and robotics experience toward a Level 1 technician certificate for an automated machine operator. Students taking the courses have been positive about the potential benefit to future employers. Active, involved employer support is intended to help Cochise College find internships for these students and recruit new high school students to this program. All students who have participated in the program said that the courses were useful and expressed interest in continuing their education at a university in an engineering program.

Potential Applications

SFAz is well positioned to lead and facilitate the expansion of a proven engineering pathway model and serve as a key resource to industry, K–12, and higher education leaders and educators. Working alongside Cochise College provides SFAz the opportunity to scale proven components to rural communities while also using its predictive analytics and measurements capability to inform future state and regional efforts. As a result, SFAz has already led the expansion of model pathway components to three additional rural community colleges—Arizona Western College, Central Arizona College, and Yavapai College—using one-year American Recovery and Reinvestment Act (ARRA) funding to expand STEM.

For More Information

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