Developing engineering identity may be key to student success

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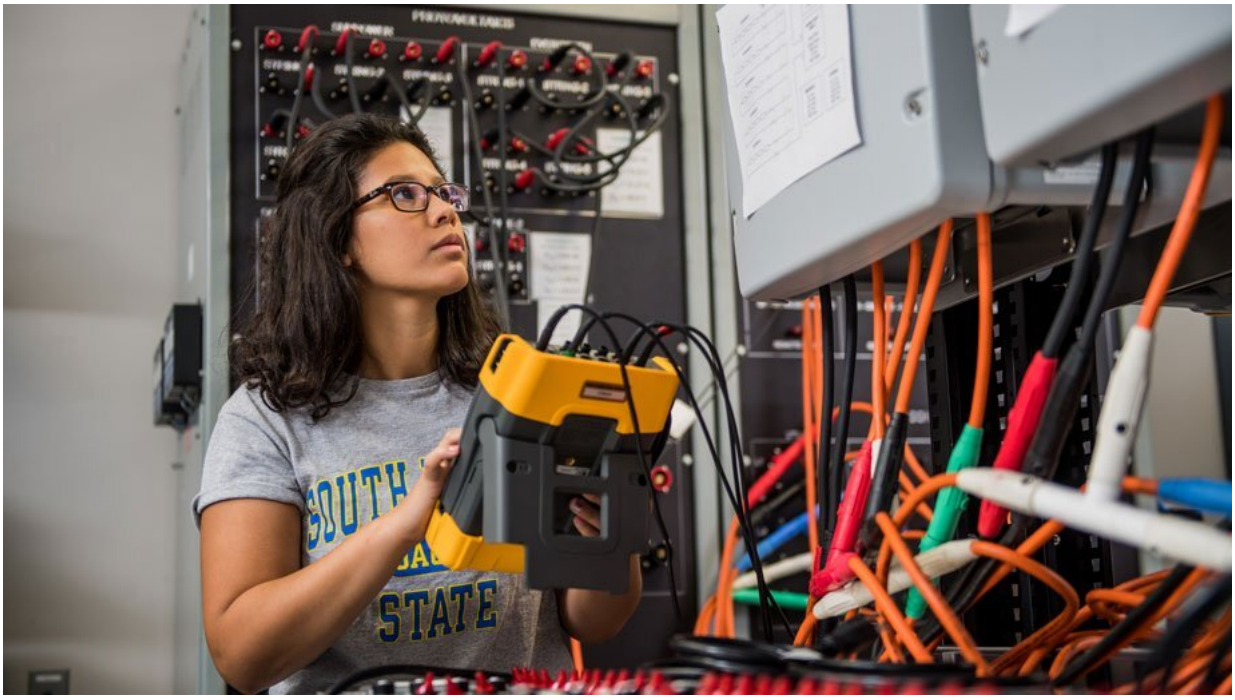

A team of SDSU researchers will assess how professional development activities, including leadership training, in engineering can impact student retention, degree completion and academic success. The goal is to increase the diversity of engineering students. Credit: South Dakota State University

Students who identify themselves as engineers early in their educational careers are more likely to complete their college degrees. That's the premise behind a new research project aimed at increasing the diversity

of engineering students at South Dakota State University.

"When you personally buy into becoming an engineer, your chances of success go up," said civil and environmental engineering professor Suzette Burckhard. However, how students develop that identity may vary. "Women may develop identity differently compared to men and there may be differences among individual engineering disciplines," she said.

Burckhard will lead a team of SDSU faculty members who will assess the impact participation in professional development activities, including leadership training, have on student retention, degree completion and academic success. The research is made possible through a five-year, $1 million grant from the National Science Foundation Scholarships in Science, Technology, Engineering and Mathematics Program.

The S-STEM project will provide four-year scholarships to 20 qualifying students pursuing bachelor's degrees in civil engineering, electrical engineering and mechanical engineering. These students will then form the researchers' study groups.

Other team members are Bruce Berdanier, dean of the Jerome J. Lohr College of Engineering; Robert Fourney, associate professor of electrical engineering and computer science; Stephen Gent, associate professor of mechanical engineering; and Judy Vondruska, a lecturer in the physics department.

"Research on how we can help these students develop an engineering identity adds a unique social science aspect to engineering education," she said. "What we learn will help engineering educators better prepare underrepresented individuals to succeed in engineering."

Recruiting study group

Scholarship applicants must be U.S. citizens with at least a 24 ACT score and a 3.0 high school GPA. The students must also be eligible for a Pell Grant, which is determined based on the Free Application for Federal Student Aid. Recruitment of the first cohort of 10 students for fall 2020 begins Nov. 1.

Those wishing to apply must fill out a separate S-STEM scholarship form available at the SDSU Office of Admissions. More than $600,000 of the grant's funds will be used for student scholarships.

"We will try to cover the students' financial needs as much as we can," Burckhard said. A second group of 10 students will receive scholarships for fall 2021.

The S-STEM scholars and their parents will visit campus as part of Scholars Weekend in February. The families will also receive updates on the benefits their children are getting throughout this research project.

Developing engineering identity

"The literature identifies engineering-related experiences and connections as key aspects of developing an engineering identity," Burckhard said. The researchers will begin building that identify among the freshman through a weeklong seminar before start of fall semester.

"Part of the idea with the seminar is to establish a sense of community within the student cohort," she explained. The one-credit seminar will familiarize students with campus life and how to develop interpersonal, team-building and study skills.

Each semester, the students will also be required to take a one-credit professional development course that will allow them to earn a

certificate in leadership. The courses and leadership certificate will be available to all engineering students.

"Students will learn more about what it means to be an engineering professional," Burckhard explained. Furthermore, practicing engineers and industry representatives will speak to classes and the students will tour engineering companies.

"We are building networking skills and increasing the students' comfort level interacting with industry and marketing themselves as engineers," she noted. These connections will help them secure internships—and eventually full-time jobs.

Brad Wermers, president of Banner Associates Inc., sees the S-STEM program as a tool to identify promising students. "This gives me an opportunity to get to know more students and thereby draw summer interns from that group and hopefully have a position for them when they graduate."

Leah Brink, corporate recruiter and student pipeline manager for Daktronics, said, "We are committed to providing challenging internships, enthusiastic industry mentors and career opportunities to the S-STEM scholars."

Facilitating academic success

In addition to connecting with industry, the students can learn problem-solving skills and receive academic support through peer mentor groups and faculty mentoring. "We want them to feel confident enough to seek help, be it from a professor or through a study group," she said.

In addition, the researchers will update engineering faculty at the monthly American Society for Engineering Education meetings on

campus. "We will be reporting on how things are going to create a ripple effect. We are studying the students but are also hoping to impact teaching."

Provided by South Dakota State University