

An Interdisciplinary Approach to Undergraduate Retention and Success

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Abstract

The University of Texas at San Antonio (UTSA) is a Minority Serving Institution and has seen rapid growth in the last 10 years; however, student income levels have not improved and UTSA is also considered a low-income serving institution. Therefore, many of our College of Engineering (COE) students have to work extra hours off-campus to meet financial needs and have limited opportunities to participate in on-campus activities focusing on their major. An interdisciplinary faculty team from mechanical engineering, civil and environmental engineering, biomedical engineering, and electrical and computer engineering created a Scholarship Program for Undergraduate Retention and Success (SPURS) with the support of NSF's S-STEM initiative. The proposed program consists of an integrated approach to increase the number and graduation rate of undergraduate students who enroll in the College of Engineering.

Keywords

Scholarship program, professional development, mentoring.

This is an extended abstract.

Overview

The University of Texas at San Antonio (UTSA) is a Minority Serving Institution and has seen rapid growth in the last 10 years; however, student income levels have not improved and UTSA is also considered a low-income serving institution. Therefore, many of our College of Engineering (COE) students have to work extra hours off-campus to meet financial needs and have limited opportunities to participate in on-campus activities focusing on their major. An interdisciplinary faculty team from mechanical engineering, civil and environmental engineering, biomedical engineering, and electrical and computer engineering created a Scholarship Program for Undergraduate Retention and Success (SPURS) with the support of NSF's S-STEM initiative. The proposed program consists of an integrated approach to increase the number and graduation rate of undergraduate students who enroll in the College of Engineering. The College of Engineering has been ranked among the top 5 "Best Schools for Hispanics" (Hispanic Business magazine, September 2012). In 2012, the University was ranked 6th in the nation for the number of undergraduate degrees it awards to Hispanics, according to "Hispanic Outlook in Higher Education". The UTSA COE puts a strong emphasis on engineering science and practical applications.

As financial constraints are a major disincentive for students to enroll and persist in higher education, this project combines scholarships with other forms of academic and professional support to ensure student persistence and completion of a B.S. Engineering degree. Providing resources and educational opportunities for undergraduate engineering students will increase the number of students graduating with Bachelor degrees in engineering and could encourage students to pursue Master's and Doctoral degrees in sciences and engineering along with increasing and diversifying the technical workforce in South-Central Texas. The overall objective of the proposed program will be accomplished by successfully completing the following three tasks: 1) Create an Undergraduate Engineering Scholarship Program; (2) Create a Workshop Series on Critical Thinking, Professional Development, and Research; and (3) Provide students with optional opportunities in research, internships or K-12 STEM outreach programs.

The SPURS Program

A scholarship program, entitled "Scholarship Program for Undergraduate Retention and Success" (SPURS), was established in Spring 2016 to promote participation of undergraduate students and thus increase retention and success of UTSA students graduating from COE. The program is specifically designed to develop outstanding graduates through training in required workshops in critical thinking, communication, professional development and research.

On average, each scholarship is \$8,000 a year and covers about 90% of the yearly tuition cost. This arrangement will allow each UTSA COE department to have at least 3 scholarship awardees each year with at least 12 students a year for the college.

Students must have completed 30 credit hours to be eligible for the program and be a United States citizen, naturalized citizen, refugee, or permanent resident at the time of application; be enrolled full-time in an engineering discipline taking courses toward the engineering degree requirements (i.e., take more than 12 credit hours a semester); have completed 30 credit hours (at least 12 hrs at UTSA); demonstrate academic potential and ability by having at least a cumulative 3.0 grade point average; demonstrate financial need, as defined for undergraduate students by the US Department of Education rules for Federal financial aid; and fill out an application that includes, but is not limited to, the following: name, contact information, classification, major, unofficial transcript (with GPA information), one faculty recommendation letter, and three essays written by the applicant addressing: how the SPURS scholarship will benefit his/her academic career, why the applicant should be considered for this program, and what is his/her 5 year plan including academic studies and professional career.

Applications are reviewed using a review matrix by a committee in the College of Engineering. Students who accept the SPURS scholarship, must graduate from their respective degree program within 3 years from receiving the scholarship and will remain in the program as long as he/she is a full-time engineering student, maintains a cumulative GPA of 3.00 or higher, participates in at least two SPURS Workshops each semester, meets with their faculty mentor at least two times a semester and COE academic advisor and career counselor at least once a semester.

To assess the impact of the SPURS program, a questionnaire modified from Murphy et al. (Murphy et al. 2006) will be given to the students who will be surveyed over time regarding their desire to attend graduate school, career choice, self-efficacy and how the SPURS-related experiences have impacted their undergraduate studies.

Below are demographics on our fellows for each semester

Semester	No. of Fellows	% Female	% Minority
Spring 2016	12	42%	83%
Fall 2016	8	38%	88%

The Workshop Series

A key component for success in school and beyond is the training and development of critical thinking, professional and research skills. A series of workshops are created each semester by the faculty and/or other support services at UTSA. Fellows are required to attend two workshops a semester. Thus far we have provided or worked with other groups to have the following workshops: resume writing, negotiating salaries and accepting offers, Your Possible Lives, Womengineering Luncheon, Expert Learner Series, Networking/Interview Skills Workshop, Mock Interview Workshop, and Negotiation and Next Steps

Other Opportunities

The SPURS program provides students with opportunities to conduct hands-on research, participate in internships, or participate in K-12 STEM outreach programs. These opportunities are not required but fellows are encouraged to participate in the opportunities at least one semester they are in the program. Many of the students thus far have participated in internships but a few have also conducted research.

Conclusion

The program undergoes formative evaluation each year and will undergo summative evaluation after five years of the program. The SPURS program builds on the faculty's experience in mentoring students and dedication in increasing diversity in academia. It is an integrated approach to increase the number of undergraduate underrepresented minority and especially female students who graduate in the UTSA College of Engineering. SPURS consists of financial assistance, workshops to increase student critical thinking and professional skills, and mentoring. In addition, students will be given the opportunity to participate in research, internships, or K-12 STEM activities. This approach will not only attract, but also retain, students in engineering and give them the skills necessary to succeed as employees and/or as graduate students in engineering. Successful completion of SPURS will not only increase the number of underserved undergraduates pursuing an engineering major, but will subsequently increase the number of students pursuing graduate studies in STEM fields. In addition, SPURS will increase the diversity of the engineering workforce specifically in South-Central Texas. It is expected that SPURS will increase retention of engineering undergraduates at UTSA; increase their critical thinking and professional knowledge, and increase their self-efficacy; taken together, these aspects will ensure timely completion of undergraduate degrees and will increase the marketability and job placement of these graduates. This presentation will further discuss the lessons learned and insights gained from the proposed model, which it is scalable and transferable to other universities.

References

- 1 Hispanic Business Magazine. September 2012. *Best Engineering Schools Directory*.
- 2 Murphy, C. and T. Hicks. 2006. Academic characteristics among first-generation and non-first generation college students, in Faculty Working Papers from the School of Education. Fayetteville State University.

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