

## **Targeted Recruitment of Disadvantaged Students: The Multiplier Effect of Senior Electrical Engineering Design Demonstrations**

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### **Abstract**

Although the importance of Electrical and Computer Engineering is recognized as one of the critical areas for producing technically competitive graduates, recruitment of students to this area presents a challenge. In part, this is due to the fact that Electrical and Computer Engineering is not part of the curriculum of many high schools; thus, students are not exposed to this field of study. Many high school students have misconceptions of engineering, a complete lack of understanding of “what it means to be an engineer”, and/or feel they are incapable of achieving such high aspirations. The University of Texas at San Antonio is the third largest Hispanic-serving institution in the U.S. One of the goals of the University is to recruit disadvantaged students and underrepresented minorities, especially those who are the first generation, to attain a degree in higher education. To this end, the authors, in collaboration with the College of Education and Human Development’s Academy for Teaching Excellence have created a bi-annual program of community outreach and recruitment. The focus of activity is the Electrical Engineering Senior Design Demonstrations held at the end of every spring and fall semester. The seniors prepare exhibits of their design to include working prototypes and poster presentations for the event. In the past, these events were promoted within the College of Engineering and visited mostly by engineers. The new initiative of community outreach and recruitment takes place through targeted invitations to math and science students in disadvantaged local area high schools. During the event, the high school teachers, chaperones and students are given presentations about the opportunities available in the Electrical and Computer Engineering Department, College and University, including financial aid and scholarship support. A recruiting package was developed to inform and motivate the students and stimulate student-to-student contact via the demonstrations presented by the senior class. Media involvement including local newspapers and television enhanced the profile of the University and the Electrical Engineering Department in the local community and provided a platform for enhanced publicity for future events, which are expected to expand given the number of schools which are candidates.

### **Introduction**

The University of Texas at San Antonio (UTSA) is the third largest Hispanic-serving University in the U.S. One of the goals of the University is the targeted recruitment of disadvantaged students and underrepresented minorities, especially those who are the first in their families to graduate from college.

The Department of Electrical and Computer Engineering (ECE) faces a special challenge in alignment with this recruitment goal. ECE is not part of the curriculum of most high schools, and thus many students are unaware of this field of study. The miniature, “invisible”, hidden or inaudible nature of the plethora of designs and devices based on ECE are often not recognized as such. In addition, many high school students have misconceptions as to “what it means to be an engineer,” and feel they do not have the knowledge, skills or background to enter this field. Even math and physics students often do not consider ECE careers as there may not be sufficient motivation (both academic and financial, e.g., scholarships) available from institutions of higher learning such as UTSA.

## **Methodology**

The ECE Department has initiated a series of activities designed to reach out to the local community high schools, especially those with students considered disadvantaged and historically underserved. The importance of information and an open, welcoming image by the ECE Department is underscored by a recently initiated promotional campaign featuring attractive, reader-friendly print material in addition to that available on the website. To this end, the Department has prepared a brief brochure intended for general use concentrated on the academic profile of the Department. In order to initiate / enhance communication with high school counselors, administrators, and teachers, a major promotional booklet has been prepared to graphically and attractively represent the multi-faceted aspects of ECE including the “real world” impact of several research programs, student success stories, and career potential within this field.

Several years ago, the PI initiated bi-annual ECE senior design demonstrations (known as “Demo Day”) held at the end of every fall and spring semester. The seniors, typically during their last two semesters, design and develop working prototypes as part of the undergraduate education in ECE culminating in the demonstration of the prototypes enhanced by a required poster. In the past, these events were promoted within the College of Engineering (COE) and were thus relatively low-profile. To attract potential students to UTSA’s Department of ECE, the authors contacted the College of Education and Higher Development’s (COEHD) Academy for Teacher Excellence (ATE). One of the activities of the ATE is to educate and follow-up with UTSA graduates who become math and science teachers. The ATE identified high schools serving disadvantaged students and underrepresented minorities; students, teachers, and chaperones from selected math and physics classes were invited to Demo Day, which was also promoted via a campus-wide campaign. As the engineering students prepared their exhibits, the high school groups were welcomed by officials of COE, COEHD, and representatives of the admissions and financial aid / scholarship offices. A recruiting package was assembled to motivate students to consider attending UTSA. To stimulate student-to-student contact, emphasizing the creative, “fun” aspects of ECE, demonstrations were given by the design students, who prepared exhibits which could be easily accessed by the public. The public affairs office played an important role in mediating the presence of local press and television coverage of the events, which served not only to enhance the profile of UTSA and the Department of ECE, but provided a platform to expand the number of high schools attending the event.

Interest has been expressed in expanding the relatively limited number of four high schools per semester (75 to 100 high school students) to include larger numbers of high schools from the San Antonio area, with the potential expansion to parties extending throughout the area to the border with Mexico.

## **Results**

Steps are now being taken to develop measures to evaluate the effectiveness of the event in changing high school students' perception of ECE, their perceptions of UTSA's College of Engineering specifically the Department of ECE and their likelihood to pursue a degree in electrical or computer engineering. This would likely consist of a pre and post event survey most likely distributed during registration and prior to the students departing from UTSA's campus.

## **Summary and Conclusions**

In summary, a description of the methodology used for the targeted recruitment of disadvantaged students and underrepresented minorities, especially those who are the first in their families to graduate from college was introduced. The centerpiece of the effort is the senior design demonstrations held at the end of the fall and spring semesters. Even though the responses from the high school students, teachers and chaperones have been extremely positive, a means to measure the degree of effectiveness needs to be developed and integrated into the event. The analysis will provide information and insight that can be used to optimize the events impact on the high school students.

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