

AC 2010-1481: ENABLING SUCCESSFUL TRANSITIONS FROM 2-YEAR COLLEGES TO A 4-YEAR ELECTRICAL ENGINEERING PROGRAM

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Enabling Successful Transitions from 2-Year Colleges to a 4-Year Electrical Engineering Program

Abstract

The goal of our scholarship program, Engaging the Community to Achieve Success in Engineering (ECASE), is to encourage and enable academically talented, but financially needy students from local community colleges to enter the workforce or continue in graduate studies following completion of a baccalaureate degree in electrical engineering at Seattle Pacific University. This paper focuses on our specific objective to maintain retention rates significantly above national averages. To achieve this, we have recognized the students' academic, social, as well as financial needs, and the importance of building a sense of community among the students, not only with the university, but with the profession as well. Thus, we have developed a number of programs and activities designed to address these issues. These programs are focused on building connections with the faculty (through faculty mentors), their peers (through social functions and the ECASE study hall), and the profession (through industrial mentors). Thus far, in the second year of the program, all of the scholarship recipients have continued to progress satisfactorily towards completion of their electrical engineering degrees.

Introduction

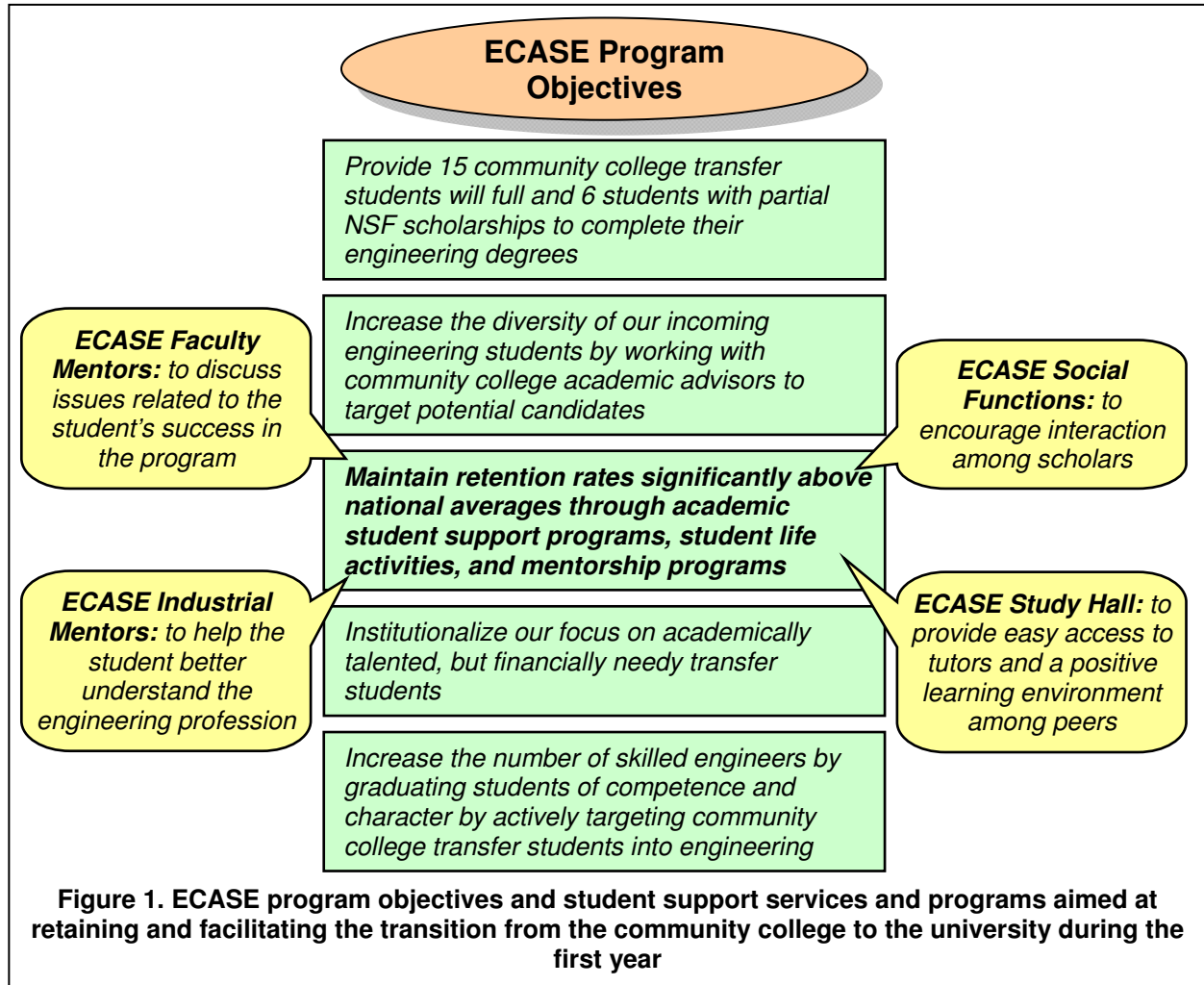
Our engineering program at Seattle Pacific University aims to address the increasing technical needs of our country (Grose, 2006, NSB 2004), including the greater Seattle community, by specifically increasing the number of community college transfer students in our engineering program, a potentially untapped resource (Anderson-Rowland et al. 2004). The National Science Foundation has supported this effort through a grant in its S-STEM program. The goal of the grant, Engaging the Community to Achieve Success in Engineering (ECASE), is to encourage and enable academically talented, but financially needy students from local community colleges to enter the workforce or continue in graduate studies following completion of a baccalaureate degree in electrical engineering at our institution. Our specific objectives are to 1) provide community college transfer students (our ECASE Scholars) with full (\$10,000/year) or partial (\$5,000/year) scholarships to complete their electrical engineering degrees in our program, 2) significantly increase the diversity of our incoming engineering students, 3) maintain retention rates significantly above national averages, 4) increase the number of well educated and skilled engineers in the workforce, and institutionalize our focus on community college transfer students. This paper is focused on our goal to maintain retention rates significantly above national averages (e.g., UCSC, 2003).

The first step of retention is for the student to make a successful transition into the four-year institution. As a result, we have implemented a number of student support services and programs that are not only aimed at retention, but are also specifically targeted to facilitate the transition from the community college to the university during the first year, as illustrated in Figure 1. These support services and programs are designed to build a sense of community for the student, not only with the university, but with the profession as well. A sense of community has been shown to be an important factor in retention (e.g., Wilson & Campbell, 2009). For example, the lack of community has been shown to be a primary reason for women leaving engineering (Brainard & Carlin, 1998), and it has been shown that student success in fields such as engineering can depend on the integration of academic and social activities, such as faculty mentoring, collaborative learning, and the formation of study groups. Thus, students not only need financial support, they often also need social and academic support in making the transition from a community college to a four-year institution.

To address this issue, the ECASE scholars have, in addition to a substantial scholarship, access to specialized programs designed to support the scholars socially and academically by building a sense of community and connection with their peers and mentors. These programs focus on mentorship, through our faculty and industrial mentorship programs, social involvement, through ECASE sponsored functions, and the development of study groups, through a tutoring program. These efforts, along with an overall description of the program are detailed in the following sections.

The Learning Environment

Seattle Pacific University is a small liberal arts institution, with the advantages of class sizes averaging around 35 campus-wide and a 14:1 student –faculty ratio. This environment provides opportunities for professors to know the students well. Our Electrical Engineering Department is characterized by an academically-challenging curriculum with hands-on, design-oriented



applications, within a community-oriented environment that is supported by a dedicated and easily accessible faculty. The small class sizes in engineering (<30) facilitate student-faculty interaction and overall cohesiveness among students.

The ECASE Scholars

The first recruitment efforts for the ECASE program began in the 2007-08 academic year for the fall of 2008. These efforts included a webpage and online application housed on the Seattle Pacific University Admissions' website to advertise the program, coordination with University Communication to design and send postcards and flyers to advisors and STEM faculty at the regional community colleges, and personal contact (via e-mail, phone or in person) with the engineering advisors and faculty at each of these community colleges. Furthermore, our (part-time) Project Coordinator also works part-time as a Transfer Admissions Counselor in the Office of Undergraduate Admissions. This arrangement provides excellent interaction and collaboration between engineering and the Admissions Office and has brought a heightened awareness of the program in Admissions. As a Transfer Admissions Counselor, our Program Coordinator is able to meet with prospective engineering students throughout the recruitment process, and she has access to more efficient ways to track and organize communication with ECASE applicants. This

has been an excellent model that maximizes our Coordinators overall efforts on the ECASE program.

We began funding the first four ECASE scholars in the fall of 2008. Three additional scholars joined the program in January 2009. All of these students continued in 2009-10, and eight new scholars were added to the cohort in the fall of 2009. The Scholars transferred from eight different community colleges located throughout the metropolitan region and the state, and they represent a diversity of backgrounds and life experiences. One scholar is a woman, two are Native American, two are Hispanic, one is African American, and two are naturalized citizens. At least three are first generation college students, and one is a Veteran of the Iraq war. All presented significant financial need through completing the FAFSA to qualify for the scholarship.

Relevant ECASE Student Support Services and Programs

Each of the ECASE support services and programs aimed at building a sense of community and supporting the successful transition and retention for the ECASE Scholars are described in detail below.

ECASE Faculty Mentors

All of our engineering students at Seattle Pacific University are assigned a faculty academic advisor to help them with their course selection and schedules as they progress through the program. After they are accepted into the major, it is optional for students to meet with their advisors and advising times are often limited to specific periods during the term. In recognition that mentorship is an important component of retention, all of our ECASE Scholars are paired with a faculty mentor in addition to their faculty academic advisor within their first year of transition. The faculty mentor meets with their mentees on a regular basis to discuss academic, professional, and non-academic issues related to each student's success in the program. In this way, problems encountered in transitioning into our program can be identified and addressed early on. Thus far, three faculty members are serving as mentors for the ECASE Scholars. Factors influencing the frequency of the meetings between mentors and mentees include the degree of student need, the availability of both mentor and mentee, the tenacity of the mentor to initiate the meeting, and the willingness of the mentee to meet. As a result, frequency of meetings has varied from once per term to once every couple of weeks. Most meetings take place in the professor's office, although attempts have been made to have meetings in other venues.

For the most part, these efforts have been positive, and mentors have been able to address potential issues, such as poor study habits and preparation and the need for tutors. We have noted, however, several areas in need of improvement. First, we need to improve the consistency of the meetings among the mentors. Ideally, the frequency should be primarily dependent upon the needs of the student (within reason). To facilitate this, we have initiated informal reports on ECASE scholars from the mentors every two weeks at our regular faculty meetings. It is not expected that every mentor will have met with every mentee on a biweekly basis, but by institutionalizing this as a part of our regular faculty meetings, we hope to encourage faculty to meet with their mentees on a more regular basis. Furthermore, we have noticed a distinctive

tendency among the community college transfer students; overall, they seem to be reluctant to come to office hours, answer e-mail inquiries from faculty, or interact with faculty in general. As a result, we have tried to emphasize the importance of talking to faculty (and mentors) in our ECASE gatherings (details follow) and one-on-one meetings.

ECASE Industrial Mentors

In addition, each Scholar is paired with an industrial mentor, usually a member of our advisory council and often a graduate of our program. The aim for our industrial mentors is to help the Scholars better understand and become connected to the engineering profession and provide an industrial viewpoint for the students as they search for internships or jobs after graduation. Our mentors come for the most part from our Engineering Industrial Advisory Board, and many of them are alums of the engineering program at Seattle Pacific. Our Advisory Board meets three times a year, and the members are very familiar with and dedicated to the electrical engineering program. Furthermore, members on the Board often hire our students as interns or as fulltime employees after graduation.

To pair up Scholars with appropriate Industrial Mentors, we asked each Scholar to write a short statement about their engineering interests and plans. We then tried to match students with Industrial Mentors most closely connected with their interests. Before each advisory board meeting (held in the early evenings), we schedule a short “Meet & Greet” function between the mentors and the ECASE Scholars. The aim here is to provide a relaxed meeting environment through efficient use of the Industrial Mentor’s time. Mentors and mentees are also welcome and encouraged to meet or exchange e-mails at their own convenience.

So far, we have had mixed results of this program in its second year. Overall, the dedication of the Mentors has been excellent. Those who cannot make the “Meet & Greet” function, often offer to meet the students at other time or invite them to visit their respective companies. The major issue has been due to the lack of responsiveness from the Scholars. Some students have indicated that they could come to the “Meet & Greet” (or other meeting) then failed to show up, and not responded to invitations from their mentors. In some cases, the students do not seem to understand the benefits of having an industrial mentor. This lack of responsiveness is consistent with the observations from the Faculty Mentoring program. This suggests that students coming from the community college system are not as connected to the academic and professional environment nor see the need for connections as those starting as freshmen at the university. Thus, this supports our premise that building and strengthening connections to the academic and professional environment is an important component for the successful transition from the community college system to four-year institutions. After consulting with the director of our campus-wide mentorship program, we are planning on developing a mentorship orientation session for the Scholars each fall to explain the benefits of the program and outline the expectations for the students and the mentors.

ECASE Social Functions

In an effort to engage our Scholars to become more connected to our engineering community, we initiated an ECASE Scholar Welcome To/Welcome Back social function this fall. The objective

here was to connect first-year ECASE Scholars with returning Scholars. We asked each of the returning Scholars to tell the new Scholars their best tips to ensure a successful transition into the engineering program. The returning Scholars took this request to heart and provided valuable feedback to the students. Several commented on the need to seek out their professors to ask questions and on the need to be better organized. This helped to reinforce our premise that transfer students are more reluctant to connect with the faculty than their peers who entered as freshmen. This event also served to introduce the ECASE Scholars in different classes to each other.

We hypothesize that the connection to their peers provides the first and most significant link to developing a sense of community between the Scholars to the University and the engineering profession. We are currently planning on continuing the ECASE social functions on a regular basis. We also aim to formally assess their effectiveness in developing this sense of community between the students to the university and the profession. In the meantime, with a limited input data, the results thus far look positive.

ECASE Study Hall

In an effort to further develop a camaraderie among the students, we have initiated a tutoring program to support Scholars in targeted engineering classes during their first transfer year. In addition to one-on-one tutoring, we are initiating an ECASE Study Hall, staffed by a tutor, where Scholars can come and work on homework together and ask questions of the tutor if needed. In this manner, the ECASE Scholars can form a cohort that serves to provide support and encouragement for each other as they progress through the program.

Our initial approach to staff these sessions was to hire one of our most outstanding senior electrical engineering students as a tutor. However, we also realized that some of our ECASE transfer students might take three years to complete their degrees after transferring, but they might not need to take a full load in the final year. Since the scholarship can only be offered to full time students, we plan to hire these students as the ECASE tutors. This further provides a sense of community for the ECASE Scholars as the more senior students have an opportunity to engage the incoming students (and share experiences), and it also keeps the senior level students from feeling alienated from the program. We feel that this is a win-win situation for all.

Summary and Conclusions

In response to the recognized needs for financial, social, and academic support for many students transferring to SPU from the community college system, we have developed a scholarship program that includes a high level of student support services and programs aimed at forming a sense of community for our ECASE Scholars. These programs are focused on building connections with the faculty (through faculty mentors), their peers (through social functions and the ECASE study hall), and the profession (through industrial mentors). Thus far, all of the Scholars from the first year of the program have continued to progress in electrical engineering and the Scholars from the second year are adjusting well into both the engineering department and the University itself.

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