



Transfer Students: Lessons Learned over 10 Years

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Abstract.

This paper will summarize the accomplishments of an NSF sponsored S-STEM program for transfer students. This program had 97 students: 41.2% underrepresented minority, 28.9% female, and 60.8% either female and/or underrepresented minority. Therefore, this program overrepresented minority engineering and computer science students in the university by almost double and females by over 60%. All of the students had unmet financial need. The graduation rate of these students is over 95%. Of the students who have graduated, 50% have gone right on to graduate school, an amazing number given that nationally only about 20% of engineering students go directly to graduate school.

The accomplishments of this group of students will be compared with the 76 students who went through the first transfer program in 2003-2008. A major difference is in the percentage of students going right on to graduate school. In the first C-SEMS programs, about 40% of the native students went right to graduate school and about 30% of the transfer students. While there are very good rates compared to students not in the scholarship program, these rates are quite a bit lower than the current 50% for transfer students. Program changes will be noted which may have been factors in the differences between the groups.

I. Introduction

In 2002, an upper division CSEMS grant (# 0123146) was awarded by the National Science Foundation (NSF) to the Ira A. Fulton Schools of Engineering at Arizona State University (ASU). The students to be benefitted were engineering and computer science majors. Henceforth in this paper, the term “engineering” shall include computer science. Transfer students, primarily from community colleges (CCs), made up half of the students the first year of the program. Recognizing the need to help more upper division transfer students, the university applied for and received a second CSEMS grant the next year from NSF (# 0324212), focused on upper division transfer students. This program ran for five years and was continued for an additional five years by an NSF S-STEM grant (#1060226). Some of the students in the second S-STEM grant were also supported by a scholarship grant from the University Women & Philanthropy group.

The major emphasis of the CSEMS program was to graduate the students, to develop the students professionally, to provide financial support through scholarships, and to have them go right on to graduate school after earning their Baccalaureate degree. These goals have remained consistent through the second transfer program. To support these goals, as a part of the scholarship, the students attended an Academic Success Class. The scholarships in this first program were worth \$3,125 per academic year, which at the time covered most, if not all, of the

annual tuition. The following minimum qualifications required for the award of a scholarship have also remained consistent through both programs:

- Minimum 3.0 GPA
- Full-time junior status student in engineering or computer science
- U. S. citizen, permanent resident, or refugee
- Unmet financial need as determined by FAFSA

Students interested in receiving a scholarship must apply. The application requests information from a personal statement of purpose, as well as a description of leadership skills and outreach activities, and two letters of recommendation for new students. Once admitted to the program, the scholarship was renewed each semester until graduation as long as the minimum qualifications were met. An additional focus was to emphasize female and underrepresented minority students.

In the CSEMS program¹ 76 scholarship students took part in the program. Some students did lose their scholarships, but continued on to graduation. The gender and minority status of the students is shown in Table 1.

	Underrepresented Minority	Non-Minority	Total
Female	9	20	29 (38.2%)
Male	21	26	47 (61.8%)
Total	30 (39.5%)	46 (60.5%)	76 (100.0%)

Table 1. Gender and Minority Status of Students in CSEM Program 2003-2008¹

The program had an emphasis on underrepresented minority and/or female students (65.8%). The percentage of minority students at 39.5% was more than double the 19% of minority students in the Schools of Engineering at the time. The 38.2% of female students in the program was also more than double the 17% of females in the Schools of Engineering at that time. At the end of the fifth year of the program, twenty-two of the students were still in school, twenty still in STEM, and many of these continued to be supported through the follow-on program for transfer students supported by the NSF S-STEM grant. Of the 76 students, 90% have graduated in engineering or math and 30% went right on to graduate school.

II. Transfer S-STEM Academic Success and Professional Development Program

In the fall of 2008, the second academic success program for upper division transfer students began. The program grant will conclude in spring 2014. Although the program continued with the same minimum scholarships qualifications as the first transfer program, the amount of the scholarship was increased from \$3,125 to \$4,000. Although the university tuition had only been \$4,000 or less for most of the first program, the tuition began to increase and currently the \$4,000 is about 40% of the total tuition, still a substantial help financially. In the 2009-10 academic year, we began a special transfer program for selected non-metropolitan schools which provided scholarships for the students from these schools. Therefore, the students in the second transfer program were similar to the students in the first program in that they were mostly from local (Phoenix area) community colleges. A few of the students in both programs have been transfers from out-of-state or from another university.

The basic statistics for the second program are given in Table 2.

	Underrepresented Minority	Non-Minority	Total
Female	9	19	28 (28.9%)
Male	31	38	69 (71.1%)
Total	40 (41.2%)	57 (58.8%)	97 (100.0%)

Table 2. Gender and Minority Status of Students in S-STEM Program 2008-2014

The total number of female and underrepresented minority students is 59 (60.8%). This percentage is a little smaller than for the first program. The primary difference in these statistics is the lower percentage of females in the program. The minority students are still represented at about twice the percentage in the Schools of Engineering, but the percentage of women is only about 50% higher than the percentage of females in engineering. At the end of the Fall 2013 semester, the following statistics held for retention and graduate school rates as shown in Table 3.

Category	Number	Percentage
Graduated	63	63/97 = 64.9%
Graduated, directly to Grad School, Full-time	29	29/63 = 46.0%
Graduated, Grad School, Part-time	6	6/63 = 9.5%
Graduated, no Grad School	29*	29/63 = 46.0%
Active	29	29/97 = 29.9%
Withdrew from program	4**	4/97 = 4.1%
Retained in program	93	93/97 = 95.9%
Total	97	

Table 3. Graduation and Retention Rates

*One student changed majors to Sustainability and graduated which is a STEM degree, but is not an engineering or computer science degree

**Two of the four students left due to family situations and are continuing to earn their engineering degree at another school. Therefore, the retention in engineering is 95/97 = 97.9%.

To date, we have had a 97.9% retention of students toward STEM degrees. The percentage of graduated students who go directly to graduate school full-time varies through-out the program. We will not know what the actual percentage will be for a few more semesters. We note that over 50% of the graduates of this program went to graduate school, either full-time or part-time. In general, the percentage has been running at approximately 50%. For more information on these programs see references.¹⁻⁵

III. Lessons Learned

After working with transfer students for over 10 years, we have learned several valuable lessons:

Financial Support:

1. Scholarships are very important in encouraging CC students to continue on to a large university. We have heard stories from students who related that they did not dare to transfer until they learned about our scholarships and the support system that we provided.
2. A scholarship without additional instruction does not guarantee success.
3. Students need to be made to do what they need to do through assigned homework. A required Academic Success and Professional Development class with a scholarship is a very strong incentive to do the “right things”.

Academic Support:

4. Academic help is needed. The Guaranteed 4.0 Plan is the best available.⁶
5. A minimum GPA of 3.0 for continuation of a scholarship is a strong incentive to spend the time needed for learning.
6. Transfer students should be in a study group for each class and need to be strongly encouraged to do so.
7. Transfer students need to be warned about “transfer shock”. *Transfer Advising Issues:*
8. In recruiting CC students, the students need to be taught to apply in time for other scholarships.
9. CC students need to be encouraged to stay at their CC as long as they can continue to make progress toward an engineering degree.
10. CC students need to learn that an AA degree does not ensure that it will only take two more years to get an engineering degree at a university.
11. CCs need to work to have an engineering/science associate degree so that students are not required to take many courses for an AA that do not count toward a bachelor’s degree in engineering.
12. It may take several visits to a large university before a potential CC transfer feels comfortable in transferring.
13. Potential transfer students need to be encouraged to contact the university academic advisor in their major. At the same time, university academic advisors need to be willing to listen to and to encourage potential transfer students.
14. An official “Pathway” that tells a student exactly what courses they can take at their CC for an engineering major and exactly what courses will still need to be taken at the university to earn a Bachelor’s degree is extremely valuable to guiding a transfer student.

Time Management, Scheduling, and Logistics:

15. Students need to continually be cautioned not to work too much or take too many credits for their workload. Students working 20 hours a week should not take more than 12 semester credits.

16. Transfer students need to be warned that even if they were able to handle 18 credit hours at a CC while working and do well academically, this will not work at a university.
17. Transfer students need to be cautioned to take only one lab per semester, if possible.
18. Transfer students need to be encouraged to take their classes spread over the week, if possible.
19. Transfer students need to spend as much time on campus as possible to avoid being “PCP” (parking lot, classroom, parking lot) students.

Social/Resources Support:

20. A transfer center can be very supportive and helpful for transfer students. It provides a “home away from home” to be with other transfer students and to have a good resource for answering questions.
21. Networking is very essential for the well-being of a transfer student, especially a new transfer student.
22. Transfer students need to know where to go to learn about university resources and to ask questions.
23. Role models of advanced students and engineers from industry with advanced degrees are important for encouragement and to show transfer students the benefits of graduate school.
24. Transfer students should be informed of the “imposter syndrome.” A major benefit of networking is that students learn that they are not the only one having some problems with their classes even though it seems that everyone else is having no problems at all.

Graduate School:

25. It is never too early to begin talking about graduate school.
26. There are many mysteries about graduate school including: what it is, what it can do for a student, who it is for, its benefits, and that a student does not have to be a “brain” to do graduate school.
27. Information about graduate school needs to be emphasized over and over in order for many transfer students to absorb the information and to consider graduate school.

Gender and Ethnicity:

28. Many females and underrepresented minority students need encouraging in order to transfer and to apply for scholarships. These students, especially, tend to think that they are not talented enough to do good academic work. We need to do more to encourage female, Native American, Hispanic/Latino, and Black transfer students. This includes talking about engineering to mathematics and science classes at the CC. Often, physics classes have no or few female

students. This also means contacting students who have been admitted to engineering and computer science and inviting those, especially females and underrepresented minority students, who are eligible to apply for a scholarship. Many of these students tell us that they did not think that they were academically strong enough to be competitive for a scholarship. Our data shows that these two groups graduate at a much higher percentage if they are in our academic scholarship program.

29. A primary reason why females are not pursuing engineering at nonmetropolitan CCs is that they do not know anything about engineering and with what little they know, think that engineering is boring and that engineering does not affect their lives. They do not view engineering as a “helping profession.”⁷
30. The myths that you need to LOVE mathematics and be a BRAIN in order to be an engineer are still very much alive among CC students.⁷

These lessons are all activities that can be done at the university, but also need to be reinforced at the CC level.

IV. Conclusions and Recommendations

By discovering and applying the above lessons, we have been able to greatly increase the graduation rate of upper division scholarship transfer students: from 70% (64% for females) to over 90%. In addition, currently we have 50% of the upper division transfer students going on to graduate school, while other upper division transfer students at ASU are attending at an 11% rate. The national average is estimated at about 20%. This is remarkable considering that our students are 60% either female or underrepresented minority or both and all have unmet financial need. Each semester many students enroll in the Academic Success and Professional Development class without scholarships. They have learned by word-of-mouth that the class can be very beneficial to them. We continue to hear from graduates that what they learned in the ASAP class is still helping them in their career after they have left the university.

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