Working with Graduate Students in an Upper Division Students Program

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Working with Graduate Students in an Upper Division Students Success Program

Abstract

Since 2002, Arizona State University has had an Academic Success and Professional Development (ASAP) class for upper division native and transfer students, as well as graduate students. The graduate students earned their Bachelor's degree in engineering or computer science while attending the Academic Success class as undergraduates with a CSEMS or SSTEM scholarship. This paper will briefly describe the program and assignments required in the ASAP class. About half of the students in the class have scholarships from a National Science Foundation S-STEM or STEP grant and are required to take the class each semester they have the scholarship. Class challenges include varying the assignments for students who repeat the class several times and to differentiate the undergraduate and graduate student assignments. The paper will describe the graduate student activities of the last year. These activities suggest innovative ways that graduate students can have their education enhanced and, at the same time, how they can help undergraduate students.

I. Introduction

Arizona State University (ASU) has had upper division CSEMS or S-STEM scholarship programs continuously since 2002. Half of the students drawn by the first program (NSF #0123146) were transfer students indicating that more needed to be done for transfer students. A second NSF CSEMS scholarship program (NSF #0324212) was started the next year focused on upper division transfer students, while the first program supported native upper division students some of whom had graduated from an NSF supported lower-division CSEM program (NSF #0094915). This program also supported graduate students who had graduated with either a CSEMS or S-STEM scholarship. The emphases of the program are to graduate the students with a strong GPA, to develop them professionally, and to have them go directly on to graduate school. The program is characterized by a two-credit hour Academic Success and Professional Development (ASAP) class, mentoring, and scholarships. The program also has a focus on female and underrepresented students. The current program for transfer students was funded by NSF S-STEM # 072869 and the current program for native and graduate students is funded by NSF S-STEM # 1060226.

From the beginning and throughout the programs, graduate school has been emphasized. Since all of these scholarship students had unmet financial need (a qualifier for the scholarship), finances were a natural barrier for graduate school. During this time, the engineering school introduced a 4 + 1 program so that qualified students could take two or three approved courses and have them double count for the Bachelor's and Master's degree. This program was successful in helping more students choose graduate school since they could get a Master's

degree in just one year past the Bachelor's degree, saving both time and money. However, not all students eligible for graduate school choose to do the 4 + 1 plan or are qualified for the accelerated program and money is still a problem for these students. Therefore we added graduate scholarships (maximum of four semesters) to the S-STEM programs for students who had graduated through our undergraduate scholarship programs. Since the tuition at ASU is currently a little over $10,000 per year, having a $4,000 scholarship per academic year is a substantial help. The students are able to support themselves for graduate school by acquiring additional scholarships and/or taking out loans.

About half of the students in the ASAP class have scholarships and are required to take the class each semester they have the scholarship. A continual challenge is to keep varying the assignments for students who repeat the class. An even greater challenge is to vary the assignments for the graduate students in the class. Their priorities and interests are different in great part to those of the undergraduate student. Ideally, the graduate students would have their own meetings, but it is difficult to find a common time and requires additional organization. Since the graduate students have taken the class several times, they are in a great position to teach and to help the undergraduate students. At the same time, some of the meetings are new topics and of interest to both undergraduate and graduate students.

It should be noted that in Fall 2012, 179 students enrolled in the ASAP class. Although there were not more scholarships available, more students joined the class due to the good things that they had heard about the class. In addition, more Academic Advisors had become aware of the class and were advising new transfer students that the ASAP class was excellent for new transfer students. Traditionally, new transfer students were directed to a one-credit ASU Orientation course designed for freshman. Since most transfer students are juniors and usually a little older than traditional students, this was not a particularly good fit for the transfer students. In Fall 2013, the engineering Dean's Office, recognizing the excellent qualities of the ASAP course, decided to start offering a one-credit academic success class for first semester upper-division transfer students. Two sections were piloted in Fall 2013 and one section in Spring 2014. Present plans include continuing these classes and eventually making it a required course for all new upper-division transfer students. Students would have an option of taking the two-credit ASAP class. The two new sections brought the enrollment in the two-credit ASAP class down and made the class more manageable for the instructor. Students in the one-credit class are being encouraged to join the two-credit class their next semester, especially if they are interested in research and graduate school.

II. The Academic Success and Professional Development (ASAP) Program

The ASAP program consists of three parts: the class, mentorship, and scholarships.[1] The semester class has two-credits which do not count toward a degree, but the grade is included in the student's GPA. Six 75 minute meetings are held each semester, with each of the six meetings being held five times in order to keep the meetings small and to accommodate the students' schedules. A seventh meeting is held at the beginning of each semester for students who are not

familiar with the "Guaranteed 4.0 Plan" by Donna O. Johnson.[2] The assignments take considerable time out of class to accomplish. The assignments are checked for adherence to the requirements of the assignment, but not graded. Students are given one week to clarify or correct deficiencies in the assignment. If a student misses a meeting, they must make-up the meeting by watching a video of the meeting on-line and writing a summary of the meeting. If a student only misses one meeting with an excuse, but makes up the meeting, and submits all of the assignments on time, they earn an A+ which is good for the GPA. It is surprising how many students each semester do not reach this standard.

The major topics for the class are covered over two semesters, but meetings do continually change. The author, an engineering professor, directs the program and is the instructor for the class. The class has built up a good reputation so that students who do not have scholarships enroll in the class due to positive "word of mouth". Academic advisors have also become aware of the program and advise students to take the class. Major topics taught in the course include: academic success tips; the Guaranteed 4.0 Plan by Donna O. Johnson[2] ; the resume, interviews, and how to work a career fair (usually taught by the Colleges' Career Services); graduate school (how to apply, the nuts and bolts, what it is really like); research (why it is important, how to start); portfolios; what industry looks for (industry representatives with advanced degrees address the students); how to choose a company; and how to network. Assignments compel the student to start research and a paper is required on their career plans for the first 10 years after their Bachelor's degree (minimum 5 pages).[3, 4] Another popular topic is 101 Finance (how to handle money as a new engineering graduate). A primary purpose of the class is to encourage and to motivate the students. The 4.0 Plan helps prevent the new transfer students from suffering "transfer shock" which can be devastating to students since their GPA starts all over at 0.0 after transfer. It is helpful for them to learn about the imposter syndrome and to learn that others are also having difficulty with some of the assignments. Forming or joining a study group and spending as much time on campus as possible is urged. This class is built around "how to learn", the core of the Guaranteed 4.0 Plan. This Plan emphasizes practical time management and how to learn, including reading the material before class, bullet point reading and notes, getting adequate sleep, and using time slots efficiently. Student who are willing to commit to this program find that they can earn A's and if they were already earning A's, can now do so in less time. For some assignments, such as an interest/research paper, the students are held to a higher standard the second time. A 10-year Career Plan Past the Bachelor's is revised, refined, and polished each year that a student remains in school. Each year, the Success Class students are asked to read "Don't Sweat the Small Stuff at Work."[5] The students are asked to select the five of the 100 lessons in which they personally need the most work. By working on these traits, the students should be better team mates and colleagues in the work world in the future. As we have mentioned, a basic form of this class (one semester, one-credit) is being institutionalized by the engineering school.

Mentoring is a second important component of the ASAP Program. The students in the ASAP class receive mentoring at several levels. The ASAP mentoring is characterized by two

engineering professors and a Center Director who are all passionate about their work with students. These professors are available to advise or to talk with the students as needed. During some semesters, the instructor attempts to meet with each class student for at least 30 minutes.

The program has a METS (Motivated Engineering Transfer Students) Center which is available to all transfer students and other students are welcome. The Center is frequented by 30-40 students daily and by 300-400 students per semester. Approximately 70% of the student use is by transfer students. The Center Director is also a strong mentor to the students who attend the class and who use the Center. She has a Bachelor's and Master's degree in engineering, as well as engineering work experience. The Center is run by successful transfer students in the program, who understand the common problems new transfer students face and know how to locate resources. These students act as role models and mentors to the students who use the Center and to the students in the class. In addition, in the class itself, with less than 30 students per meeting, newer students have role models and are required to find mentors in the class among the seniors and graduate students. In addition to engineering school-wide free tutoring, free tutoring is provided in the METS Center upon demand. The engineering school is committed to sustaining the METS Center as a student support center for both transfer and native students.

A third part of the program involves resources and money. The ASAP Program is well supported by the METS Center with space for networking, doing homework, using a computer for writing or printing, study groups, or socializing. The program personnel have already been mentioned. However, the largest resource the program has is scholarships for the students to help ease the number of hours they need to work to survive while in school and to lower the amount of loans they need to procure. The scholarship is important for the financial benefit, but it is also a large motivator.

The minimum requirements for obtaining and maintaining a scholarship are as follows: [6]

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

Therefore the scholarship is a large motivator for the student to continue to keep their GPA above 3.0. It is our philosophy that just handing a scholarship to a student does not guarantee that the student will benefit. The student also needs guidance in how to manage time and on how to learn. The scholarship requires that the student take the ASAP class. The assignments of the class are all designed to help the student. Most of the students have no idea why they would want to consider graduate school, have put little thought into their life plan for 10 years after the Bachelor's degree, and are sure that they do not want to do research (but don't really know what it is). Because the students want to get a good grade in the ASAP class, they do the assignments and through them they get new information, have insights, and make new decisions.

Adequate, continued funding for the sustainability of a program such as we have described is the biggest challenge. Finding adequate scholarship money for the number of well-qualified scholarship applicants is a difficult job. Because we have not been able to cover all of the strong applicants, we introduced and NSF supported the introduction of $300 scholarships about five years ago.[6] If a student qualifies for, but was not awarded the $4,000/year scholarship, by enrolling and earning an A in the course the student will receive a $300 scholarship. A student may earn a maximum of two $300 scholarships. We have had strong support from National Science Foundation through five different CCEMS/S-STEM grants which have provided scholarship money for native upper division and graduate students (# 0123146 and #0728695) and transfer upper division students (#0324212 and #1060226). In addition, NSF supported lower division S-STEM programs (#0094915, #0422447, and #007804) which fed students into the upper division program. In addition, some scholarship money for students from targeted community colleges came from an NSF STEP grant (#0856834). Several students have taken the course for a year without a $4K scholarship and have earned a scholarship the next year. Starting in 2013, we have been able to supplement the declining NSF funds with a $100,000 grant for scholarships from the ASU Women & Philanthropy group. We are currently applying for additional program funding and support through NSF, private philanthropic organizations, and industry represented by our Advisory Council. III. Graduate Students in the ASAP Program

During the first two S-STEM grants for upper division native and transfer students, the number of graduate students in the program was small.[7] By the end of these first programs, we had over a 90% graduation rate with about 30% of the transfer students and 40% of the native students going on to graduate school. Quite a few of these students went to other schools to do their graduate work with strong financial packages. As we worked with the students and became more familiar with what students need to know and understand before they commit to graduate school, these percentages increased. Currently we have a 95% graduation rate and at least 50% of our scholarship students, both transfer and native students, are going directly to graduate school fulltime after earning their Bachelors. These numbers are outstanding, especially when you consider that only about 70% (lower for females) of upper division transfer students at ASU graduate in engineering. In addition, only a little over 10% of these graduates go on to graduate school. In addition, less than 20-25% of all engineering graduates nationally go directly to graduate school full-time. The percentage of our students going directly to graduate school is all the more outstanding when we consider that all of our students have unmet financial need.

The number of graduate students in the ASAP class has been slowly growing, in spite of encouragement for the students to study elsewhere, which many of them do with full financial support. In Fall 2013, there were 14 graduate students among the 110 students in the class. There is certainly an advantage for the undergraduate students to have graduate students in the same class. The graduate students act as role models for graduation and graduate school, can report on past internships or research positions, and can testify how various parts of the ASAP class have helped them and give advice. During the first meeting of each semester, the class is devoted to hints and reminders for success in engineering school. The graduate students take part in this

discussion with their views and "words to the wise". The graduate students are respected and heeded by the undergraduates. We have encouraged the seniors and graduate students in the class to act as mentors to the juniors and have piloted such programs with mixed success. Next we describe recent efforts to formalize some programming for the graduate students.

IV. ASAP Program Activities for Graduate Students

In addition, to helping with the first meeting of each semester with hints and advice on succeeding in engineering at ASU, the graduate students report on internships, research projects, and practices they have learned to make their academic life easier, especially parts of the "Guaranteed 4.0 Plan."[2] This interaction helps the undergraduate students be more likely to take the advice being given to them.

There are two meetings each year that are instructed by the graduate students. Three or four graduate students in the program (sometimes some graduate student alumni) give each session of a meeting titled, "Nuts and Bolts of Applying to Graduate School." The graduate students are asked to volunteer for at least two of the panels. The students are given a list of the major items that undergraduate students need to know. They are encouraged to develop a PowerPoint presentation and are invited to add any topics of import to the list. The students act as a panel going over the material and inviting questions and discussions from the undergraduate students along the way. It is usually an enjoyable experience for both sets of students.

The second ASAP meeting presented by the graduate students is entitled: "Graduate Panel: What is Graduate School Really Like?" This second meeting is a favorite of the ASAP class students. The instructor often acts as an emcee and asks the graduate students questions most often asked by undergraduate students, plus the undergraduate students are encouraged to ask questions at any time during the meeting. The graduate students are given a list of the questions before the meeting. Popular questions include: why did you decide to go to graduate school, why did you decide to go to graduate school without working first, how are you financing your graduate work, why not let a company pay for graduate school, are the classes harder, and don't you have to be really smart to do graduate school. Although the graduate students' answers are often the same information the undergraduate students have heard before, since it is coming "from the horse's mouth", it seems to be more credible and some students decide to go to graduate school based on this event.

In the past, we have encouraged the newer students in the ASAP class to find a mentor among their senior and graduate student classmates. We are now experimenting with a more formal program: students in the class who are in their first or second semester at major university must find a mentor, preferably of the same major, in the class who has been at the school for more than two semesters. Class students who have been in the school more than two semesters must volunteer to mentor up to two students in the class. A student assistant assists with pairings, if necessary. It is a requirement for the newer students to find a mentor and a requirement for the

older students to make themselves available to at least one mentee. The rules for the mentoring are that the mentee must contact the mentor three times during the semester, with at least three questions each meeting. At least one of the meetings must be face-to-face. All students in the ASAP class are required to do 10 hours of volunteer service. Any time spent in mentoring, for either the mentor or the mentee, may be counted toward these 10 hours. A short report of the meetings is required for credit on this assignment.

In the past we have experimented with the graduate students having their own separate meeting. One semi-successful meeting was having a panel of advanced graduate students address their questions and concerns. A difficulty with such a meeting is that graduate school varies greatly by department and advisor. The information and advice from an advanced graduate student in one area may not be applicable for a graduate student in another department or with a different thesis advisor.

We are experimenting with additional graduate student meetings, in lieu of the students attending the regular ASAP class meeting. With great difficulty we were able to find one 75-minute period in Fall 13 which all of the students could attend. The graduate students were given a book to read, "Women Don't Ask".[8] At the graduate student meeting, each student reported on the section of the book they had been assigned to read and the students discussed the book. Their assignment was to select a situation in which to negotiate and to write a 1-2 page paper on their experience. The idea for doing such a class meeting was inspired by a similar setting in the book.[8] The students found the exercise useful. Most women and some men do not ever ask for anything that could help them promote their career and expect that their good work will be noticed. This book gave the students an awareness of asking and negotiating that should hold them in good stead in their careers.

This semester, we are experimenting with two additional assignments. The graduate students were given a copy of "Who Moved My Cheese" [9], asked to read the book, met to discuss the book, and were asked to write a short paper about what they had learned from the book. In lieu of writing another research paper assignment, the graduate students were asked to research lists of 8-10 items of the desired characteristics for an engineer of the future. The students were then asked to write a paragraph or two how on they measured up to each characteristic. They were then to select the two areas in which they judged themselves to be the weakest and propose a plan to strengthen these areas.

V. Evaluation and Recommendations

The attempt at formal mentoring this year has been semi-successful. By limiting the number of mentees to two, we have avoided a problem in the past where an advanced student was requested as a mentor to several students, accepted them all, and did not have the time to follow through well with all of them. Some new students have complained that they could never get a response from their mentor. In this case, they are to report this situation to the student coordinator who will talk with the mentor or reassign the mentee. In other cases, we have heard glowing stories

from mentees on how their mentor has helped them. One mentee discovered that his mentor was also attending a national student engineering conference. The mentor took his mentee under his wing, taught him the ropes of a national conference, and the mentee had a great experience. We will continue with this program and attempt to get all of the graduate students involved since it is usually an excellent experience for the mentor.

The graduate students were enthusiastic about being given a copy (paid for by program funds) of a book on negotiation. Although the book is written by a woman and women are the focus of the book and its examples, some men also have trouble asking for consideration when they should be doing so. Also, since women in general have male bosses and believe that their good work will be recognized and they should not have to ask for special attention, it was considered to be a good education for the men who will be future bosses and want to treat their reports justly. Both the females and the males appreciated this experience and learned from it, although some of the males still doubted that young women today would not "ask and negotiate". The research cited in the book shows that even today a woman who does an excellent job may lose a promotion to a less qualified male who asks for it when she does not ask and expects that her work speaks for itself. The paper assignment made the students think about negotiating and actually try a negotiation. Although the success of the negotiations had a fairly wide range, it is hoped that by going through the exercise and thinking about it, the students will be more likely to "ask and negotiate" in the future.

A recommendation is that each semester the graduate students have at least one meeting by themselves with the topic to be decided with input from the students. The meeting could be centered on another popular or controversial book or perhaps a special speaker of interest to most of the students. The inputs from the students on the book about moving cheese and change have not yet been completed. Based on the general reaction, we will probably continue to have the graduate students read one book a semester. Reading the Carlson Book and practicing some of his lessons should be especially useful for graduate students as they contemplate joining an outside workforce soon. Most students find this a fun and useful exercise.

In a recent survey, 70% of the scholarship students in this program who have decided to go directly to graduate school stated that they did so because of the ASAP program. Many other students stated that the ASAP Program confirmed their thoughts that graduate school might be a good choice. It would appear that the influence of the graduate students in this program through their panel on graduate school and other interactions with the undergraduate students is a very strong factor in these graduate school decisions. A recommendation from our work would be to encourage graduate student interaction with undergraduates as much as possible to help increase the number of engineering advanced degrees in the United States. At the same time, we need to continue to search for good separate activities for the graduate students to strengthen their skills outside of the classroom.

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