

AC 2008-896: ADDRESSING FRESHMEN RETENTION THROUGH FOCUSED ADVISEMENT AND SEMINAR PROGRAMS

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Addressing Freshmen Retention through Focused Advisement and Seminar Programs

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Abstract

The issue of attrition in engineering during the freshmen year is a challenge for most colleges and universities. The Viterbi School of Engineering at the University of Southern California (USC) has designed a two pronged approach to address retention of our freshmen students. One, we provide a higher quality of student interaction through programs, services and opportunities that specifically target freshmen. The First Year Excellence (FYE) Program, implemented in Fall 2006, centralizes advisement for all freshmen in the Student Affairs Office and includes a workshop series on topics such as time management, selecting minors and a spotlight series highlighting different disciplines within engineering. As a result, we find that freshmen student's feel supported, more invested in the community, and knowledgeable as they begin their transition from high school to the college environment, unlike many of their peers who may feel overwhelmed and intimidated. Secondly, developing academically driven coursework that engages freshmen students immediately in real world engineering issues is complementary to the core classes they are taking in math and physics. Our Freshmen Academy Program, currently in its 4th year, is a unique seminar style course taught by engineering faculty for all freshmen engineering students. This exciting, interactive class addresses topics ranging from the ethical issues that engineers face, current issues and future challenges for engineering and general concepts that provide a general foundation for problem-solving and engineering concepts. This type of early engagement assists freshmen students in visualizing a direct correlation between their current classes and what they will be involved in later in upper division courses and within industry. In the past three years we have seen a significant increase in the freshmen year return rate to the engineering major, from 85.4% in 2003 to 91.3% in 2006. The concentrated efforts around high service programs and early academic engagement in engineering have been instrumental in assisting us in retaining freshmen students.

Introduction

In today's environment of declining interests in engineering as a major for high school students, there is a need to be more creative and innovative in order to retain and graduate undergraduate students who choose to pursue engineering in college. The trend of "weeding out" engineering students with only "the tough surviving" is a practice of the past. Instead, we need to implement programs that are supportive and encourage students to succeed in all areas of engineering. Advocates for future engineering challenges agree that the continued success of technical innovation rests in academia and its ability to captivate and educate the world's future engineers. That mission begins early with K-12 curriculum innovation and outreach programs that encourage young children to explore engineering, but is equally important in the freshmen year at the collegiate level. It is in the first year that we need to engage engineering students in a

variety of ways so that they will persist in the field despite challenging coursework, demanding schedules and competing priorities.

A two pronged approach that is comprehensive and holistic is a way to address engineering retention – one, by providing high quality student support and services to students and two, creating academically driven courses that will engage and connect students early in their academic careers to the field of engineering. The USC Viterbi School has established a strong programmatic response to both of these areas and has seen significant increases in our freshmen return rate as a result.

This paper will discuss at length the First Year Excellence (FYE) program developed to provide high level student affairs related service and support programs for our undergraduates, as well as an academic course, the Freshmen Academy Program, implemented to introduce freshmen students to general concepts and issues. Using statistical and survey data over the past four years, we will highlight the positive influences these programs have had on our freshmen attrition rates.

First Year Excellence

The First Year Excellence (FYE) program was implemented in Fall 2006. The primary mission of the program is to focus on the challenges and issues facing freshmen engineering students as they transition from high school to college. Prior to the implementation of FYE, freshmen students had multiple advisors in both the Student Affairs Office as well as the academic departments. This created issues of inconsistency and continuity with academic advisement as well as providing little opportunity for students to develop relationships with advisors. In addition, the programs and services provided to students varied by department, areas of emphasis and other factors. FYE was designed to create a centralized resource for freshmen to help them feel connected to and supported by the school. In benchmarking at other institutions we have found similar programs yield tremendous success. Farvardin¹ attributes centralized advising, along with community building activities at both the school and student organization level, as one of the primary factors in increasing many institutions' return rates. Located within the engineering Student Affairs Office, a five person team works with the entire freshmen class of over 400 students on issues ranging from academic advisement to tutoring services to designing and delivering needed support programs and workshops. The goal of the program is to develop relationships with, advocate for and support each freshmen student throughout the first year, to enable their success and to aid them in developing the necessary tools for college success throughout their tenure at the institution.

The primary tenet of the FYE program is **Explore, Connect and Succeed**.

Explore encourages freshmen students to learn and capitalize on the numerous opportunities and resources found both at the university and within the engineering school, as well as the neighboring community. From city excursions to campus and neighborhood shows and festivals, freshmen are encouraged to explore their new community. Through student life programs such as the newly designed and implemented Klein Institute of Undergraduate Engineering Life (KIUEL) within in the USC Viterbi School we provide opportunities for freshmen students to

engage in activities around leadership development, globalization, service learning and cross disciplinary activities.

Connect is a key component in the FYE program. We feel strongly that all students, particularly freshmen, have to connect with their environment and community in order for them to be truly satisfied and successful. We encourage students to connect with student clubs and organizations, various Student Affairs Offices such as Women in Engineering and the Center for Engineering Diversity, their academic departments, research labs and other areas related to their interests. Students who are more involved in the campus community are typically more successful inside the classroom. It is through these connections that students gain confidence, as well as leadership, communication, and teamwork skills that will make them successful engineers in the future.

Succeed directly relates to the individual support provided for each freshmen student. It centralizes all academic advisement so freshmen students have only one advisor their first year who they meet during summer orientation and work with until registered for fall of their sophomore year. This provides consistency, as well as relationships built on solid communication, knowledge of the student's personal history and most importantly, trust. These advisors are a crucial component in solving the retention puzzle as they identify students who might be at risk and work with them in determining ways they can become more successful students. The Academic Success Workshop Series that is offered as part of this program includes topics such as time management, networking with faculty and a career education component. In addition, there is an academic resource center that provides peer tutoring, supplemental instruction for key gatekeeper courses and a resource library.

Freshmen Academy Program

In most engineering curricula, students spend the first two years in core classes such as math, physics, computer programming and foundational engineering courses. Research has shown that early academic engagement directly impacts the freshmen experience and can significantly increase freshmen retention. As Wankat and Oreovicz² discuss, small class sizes, hands on active learning, and making connections between core classes and future engineering practices, are all key factors in increasing attrition. The Freshmen Academy Program was implemented in Fall 2003 as a pilot program and continues today as a one semester, two credit hour seminar required for all freshmen engineering students. The Academies are divided into twelve sections in order to keep the size of the actual section at no more than 35 students each. The Freshmen Academies are designed to help freshmen learn about the overall importance of engineering, the ethical implications of engineering decisions and understand how engineers affect society, technology, history and politics. They provide a unique opportunity for engineering freshmen to develop an academic community with other engineering freshmen and faculty outside their specific engineering degree programs. Through interactive, dynamic and discussion based seminars, as well as hands-on activities, students begin to not only learn about but practice many general engineering concepts as well as understand the importance of engineering. As evident in Knight, Carlson, and Sullivan's³ longitudinal study, this type of curriculum change has steadily increased return rates at many institutions. In addition, the Freshmen Academies have "Coaches,"

upper division engineering students who serve as peer mentors that support and serve as a resource for all freshmen during their transition to college.

Course Structure & Content

All Freshmen Academy classes are taught by full time engineering faculty that are specifically selected by senior level administration. These faculty members are innovative, creative, and dedicated to working with freshmen engineering students. As Vogt⁴ emphasized, the more connected the student feels to both the faculty and the academic process, the more successful they will be. The relationship with Freshmen Academy faculty positively impacts the student's confidence level and greatly contributes to their personal and professional self-assurance. This elite group of faculty design their own syllabus within common parameters set for the program. The seminar is not meant to be rigorous in content but rather interactive and high energy, introducing thought provoking activities that introduce the student to the world of engineering outside of the technical realm. The seminar is intended to enable students to visualize the link between what they are currently learning in their core classes and what they will do in future years in both academia as well as industry. Class syllabi include presentations by guest speakers from various engineering departments to industry professionals to prominent engineering alumni and friends. In addition, there are class projects surrounding problem solving approaches that include building trebuchets and catapults, building boats out of model airplanes, an engineering Olympics competition and more. The Freshmen Academy Program also hosts a Large Academy Lecture Series where all freshmen are brought together four times a year to hear from high profile, successful engineers or technical entrepreneurs who discuss engineering relevance in their respective fields and why engineering is a foundational degree that can lead to many career options for students. These presentations and discussions provide insight and incentive for our freshmen students to learn where engineering careers can take them in the future.

“Coaches” and Mentorship

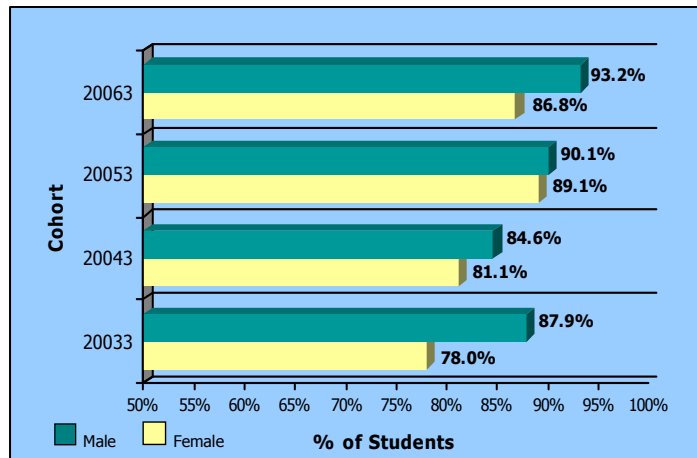
The other component of the Freshmen Academy Program is the role of the Freshmen Academy “Coaches”. Coaches are upper division engineering students that apply for the position and are competitively selected by the engineering Student Affairs Office to serve as mentors for all freshmen engineering students. All Coaches attend a training program in the summer prior to the start of the fall semester as well as subsequent meetings and training exercises throughout the semester. There are approximately two Coaches per academy section. They function in a teaching assistant role for the professor, and will often lead many of the interactive class discussions and projects, as well as serving as an academic resource for students. In addition to a support role for the faculty, Coaches serve as peer mentors for the students. Coaches plan community building activities outside the classroom for students to meet each other and develop bonds and build community among the freshmen. These activities range from group dinners to museum visits to activities that help students explore the university campus overall. Coaches hold “office hours” to provide an opportunity for freshmen to talk with them about any issues or problems. This outlet provides a comfortable, relaxed peer relationship for freshmen students. The mentor not only provides support and encouragement but also serves as a positive, upper division role model. In Loftus⁵ article, it is shown how influential mentors can be for freshmen, both academically and socially. Coaches work closely with the engineering Student Affairs Office on how best to support and counsel students, creating another key component in the retention cycle.

Outcomes

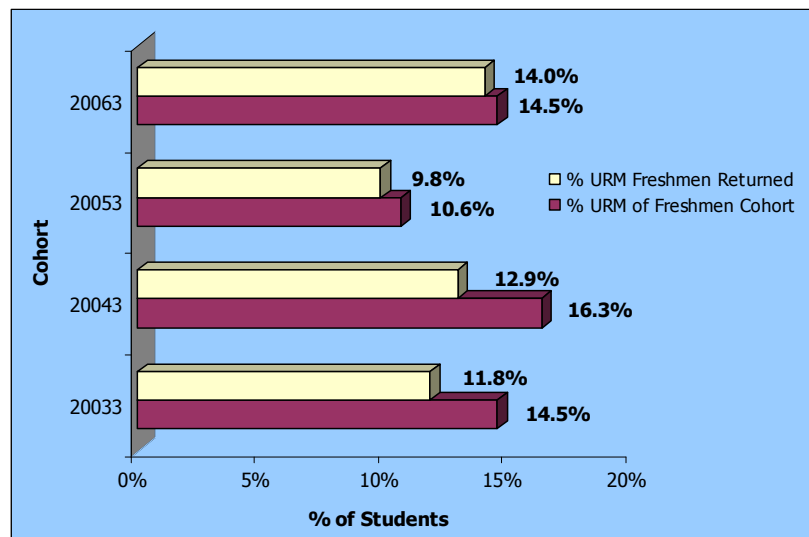
Data

We have seen a steady increase in our return rates since the implementation of both the First Year Excellence Program and the Freshmen Academy Program. This model, which includes both strong student support programs as well as early academic coursework that engages students in the field of engineering, has resulted in a 6% increase in the freshmen to sophomore return rates to engineering over the past four years. Other key data outcomes are listed below:

- Increase of 8.8% in retention of female freshmen cohorts for 2003 to 2006.
- Increase of 5.3% in retention of male student cohorts for 2003 to 2006.

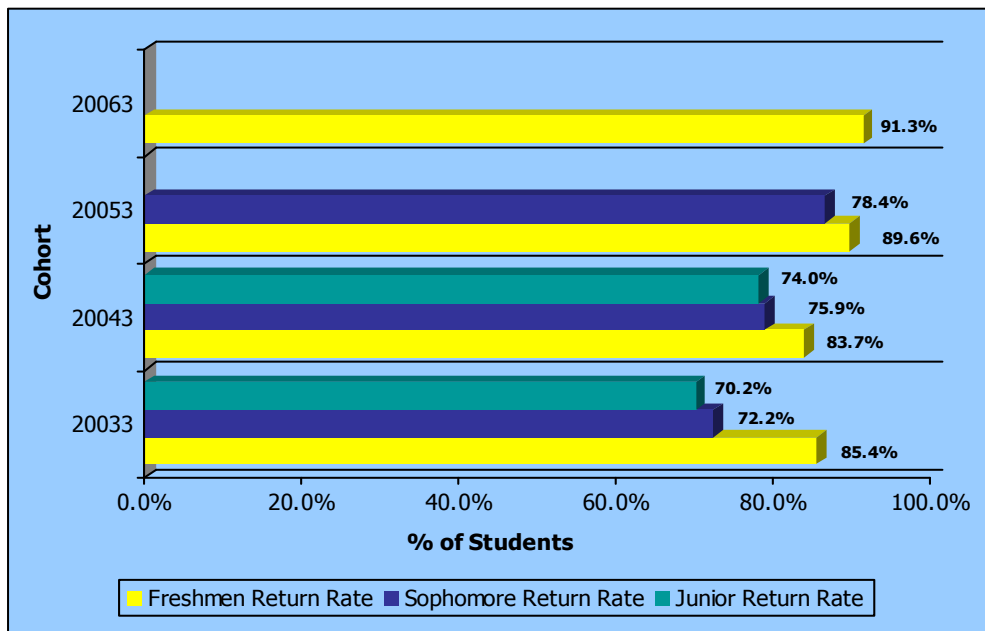


- Freshmen year return rates of underrepresented students (URMs) have average increases of 2% per year.



It is also important to note that as a result of higher return rates, we also see trends towards an overall increase in graduation rates for the future.

- There has been a 6.2% increase in the sophomore year return rates for freshmen cohorts from 2003 to 2005.
- There has been a 4 % increase in the junior year return rates for freshmen year cohorts from 2003 to 2004.



Our goal is to continue increasing the number of engineering students that graduate each year and higher return rates year by year will be instrumental in accomplishing this goal. We anticipate that these trends will ultimately translate into higher four, five and six year graduation rates within engineering.

Freshmen Survey

At the end of fall 2006 and fall 2007, we administered a Freshmen Survey that asked USC Viterbi School freshmen questions regarding their experience thus far at the university as well as within the engineering school. With a 42%, 40% response rate respectively, respondents provided feedback on our programs and services from the perspective of our freshmen engineering students. Key results are highlighted in the following chart.

Surveyed Experience Outcome	Fall 2006 Response	Fall 2007 Response	% Change
Satisfied with academic experiences at the engineering school.	89%	89%	0%
Satisfied with co-curricular experiences at the engineering school.	75%	81%	+6%
Had a positive overall experience with their First Year Experience advisor.	88%	92%	+4%
Top reasons that experience at the engineering school was positive.	Professors (80%) Classmates (77%)	Classmates (85%) Professors (80%)	N/A
The Freshmen Academy Program increased awareness of engineering.	83%	86%	+3%
Felt more connected to engineering community as a result of Freshmen Academy Program.	81%	90%	+9%
Felt Academy Coaches were positive mentors and resources.	92%	95%	+3%

Conclusion

As supported through benchmarking and targeted research, addressing retention through quality student support services and programs is key to developing confidence, trust and community among freshmen engineering students. USC Viterbi School's First Year Excellence program provides that professional, supportive network to our students. In addition, the Freshmen Academy Program intellectually engages freshmen by exposing them to real-world engineering issues so they begin developing a greater understanding of engineering and its relationship to society beyond the traditional technical aspects. Together these two programs have created a more holistic and positive experience for our freshmen engineering students, increasing our freshmen return rates and overall attrition rates.

Bibliography

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- ¹ Farvardin, N., "Retaining Students – and Their Hopes and Dreams", ASEE PRISM, March 2007
² Wankat, P., and Oreovicz, F., "Starting with Square One", ASEE PRISM, November 2005
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⁴ Vogt, C. M., "Faculty as a Critical Juncture in Student Retention and Performance in Engineering Programs", Journal of Engineering Education, January 2008, pp. 27-36
⁵ Loftus, M., "Lending a Hand", ASEE PRISM, January 2005