A COURSE TO RECRUIT AND RETAIN WOMEN IN ENGINEERING

Stephanie Blaisdell

College of Engineering and Applied Sciences
Arizona State University
Tempe, Arizona 85287

Abstract

During the Fall semester, 1994, a new course entitled "Professional Development for Women in Engineering and Applied Sciences" was offered to students at Arizona State University. The program, funded by the Women in Applied Sciences and Engineering (WISE) Program, was housed in the College of Engineering and Applied Sciences. Eighteen students, all female, enrolled in the course. Students ranged from undecided freshmen to seniors in their last semester.

The goal of the course was to recruit and retain women in the College of Engineering and Applied Sciences. Toward that end, the content of the course ranged from occupational information about different engineering fields, to career development issues, such as finding a mentor, networking, researching a company, resume writing, and interviewing. The format of the class was primarily lecture, by the instructor, and by a number of guest speakers. Small group discussions and team projects were also employed.

Overall evaluations of the course were positive, and suggestions for improvement are discussed.

Introduction

The underrepresentation of women in engineering programs is well documented. In January, 1995, only 2.7 percent of women entering college planned on majoring in engineering, whereas 14.6 percent of the men planned to major in engineering. To complicate the matter further, students leave engineering programs more than any other major, at a rate of approximately 66 percent. Women are among those most likely to leave engineering.

This paper describes the development and content of a course entitled "Professional Development for Women in Applied Sciences and Engineering". The course was offered to students at Arizona State University through the Women in Applied Sciences and Engineering (WISE) Program during the Fall semester, 1994. The purpose of the course was to recruit and retain women in engineering and applied sciences. The extent to which the course served this purpose, and future directions for the course, are discussed.

Course Development

Why a course for women in engineering?

The Women in Applied Sciences and Engineering (WISE) Program at Arizona State University was founded in July, 1993. From its inception, the program was charged with recruiting and retaining women in the College of Engineering and Applied Sciences. The WISE
Program researched how it could best serve this purpose by examining similar programs already in existence, and by conducting a climate survey within the College. Armed with this information, the WISE Program began its services to students in January, 1994.

A considerable amount of the program's initial efforts were focused on offering a seminar series addressing issues the climate survey participants reported would be valuable to them. However, due to the students' busy schedules, participation in the seminar series waxed and waned throughout the semester. In an end of semester survey, students expressed a desire for the seminars, but complained that classes often interfered with their participation. With this concern in mind, the program's developers conceived an idea for a course that would encompass the seminar series and offer additional career-related information, while allowing students to participate to a greater extent by offering a regular schedule and course credit.

An additional benefit of the course was that students outside of the College could enroll and have the opportunity to learn more about becoming an engineer. By offering the course for credit, it was hoped undecided students would be attracted to the course, making it a potential recruitment tool.

Finally, preliminary data suggests that women in the College may be dropping out of engineering classes within the first 21 days of class at twice the rate of male students. By encouraging women new to the College to enroll in the course, an early intervention to retain these students is provided.

Administrative issues.

The idea for the course was presented to the Dean's office. Support for the course existed, and a draft of the syllabus was submitted. While the administration expressed some reservations about teaching professional development issues to underclassmen, the syllabus was approved. For now, the two course credits were applied as a non-technical elective for students both within and outside the College. While the course will enter the process to be considered for technical elective credit next year, the College administration has already expressed resistance about allowing this to happen. In anticipation of this process, the course is being offered for three credits in the Fall, 1995, to make it a more likely candidate for approval.

The course was marketed prior to the Fall, 1994 semester through various means. An announcement about the course appeared in the WISE Program's newsletter, flyers were posted around the College, information about the course was sent to the university academic advisors, and letters were mailed to women enrolling in the College for the first time and to freshmen and sophomore undecided women. While the course was marketed to women students, it was open to males as well.

Course Description

Course format.

Because the course was to cover a variety of career development issues, it was decided that someone with knowledge in these areas should teach the course. While this author, with a background in counseling psychology, served as the primary instructor, a number of guest lecturers, including graduate students, faculty members, and local professionals were brought in to cover issues within their area of expertise.

The course met once a week for two hours. Eighteen students, all female, enrolled in the course. Students ranged from undecided freshmen to engineering seniors graduating at the end of the semester. This mix at times complicated the course, because the students had a variety of needs, but it was also beneficial because the students could learn from each other. Several sessions of the course were open to other students and advertised throughout the College, thereby replacing the WISE Program's seminar series.

Grading was based on five assignments and class participation, which was weighted
heavily. Assignments included writing a resume, which was critiqued by three other students before being turned in for a grade; a SIGI+ printout, company summary sheet, presentation and final paper, all discussed later in this paper. Students were required to purchase a reading packet, and it was expected that they would come to class prepared to discuss each reading.

Course content.

Since the course was offered to both current and potential engineering students, information pertinent to individuals at various points on the career development continuum was included. The course was designed to encompass the seminar series that the WISE Program previously offered, address issues students requested via the climate survey, and help undecided students become familiar with engineering in general. While the syllabus is not so clear cut due to scheduling necessities, for purposes of describing the course, it can be broken into four major sections: 1) How to choose a career; 2) How to get a job; 3) How to survive; and 4) How others have done it.

Students were helped to understand how to choose a career utilizing the Trait and Factor Theory. This is a simple theory stating that one should first assess one's self, then assess what jobs are available, and finally make a match. Students were assisted in assessing their values, skills and interests by discussing them and by using SIGI+, a computer-assisted guidance program available in most university career centers. Addressing math anxiety, which can skew an individual's perceptions of their skills, was also a part of this component. Information about various fields of engineering was provided to help students know what jobs are available. This information was provided through a number of sources, including graduate students, faculty members, professionals, and by the students working in groups among themselves.

Skills training for obtaining an engineering job made up the second section of the class. This included information on how to network, write a resume, interview, and research a company. This information was provided primarily by the instructor. As a part of this component, students became familiar with the university’s Career Development Center and the various resources available to them there. Students were required to research a company that employed engineers and write a summary sheet that included basic information. Students made copies of the summaries for their classmates, so each student had 18 company summaries upon leaving the class.

Women's issues such as how to find a mentor in a male-dominated profession, sexual harassment, inter-gender communication, breaking the “glass ceiling”, and stress management comprised the “how to survive” component. These issues were addressed by a number of local professionals. During the session on inter-gender communication, male students from another class that was having difficulty actively including women team members joined the class. Including them may have inhibited some women students, but for the most part it seemed to make for a lively discussion and provided some real life examples of the differences between men and women's communication styles that could then be processed.

The fourth component of the class, “how others have done it”, was addressed throughout the semester by providing the students with exposure to models. An important point here is that models were not “super-stars”, nor did they focus on just their successes. Models should be realistic and discuss the barriers they have faced in their own careers and how they overcame them. These are called “coping models”, and have been shown to be more effective than "mastery models". Models for this class included a panel of women engineers, women graduate students and faculty in engineering that discussed various topics or attended a faculty open house, and the subjects of the students' presentations. Students were assigned to research or interview a woman who had made a contribution to a field of engineering or applied science and give an oral and written report about her. The subjects the students chose for these reports were fascinating and inspiring and the presentations provided a great conclusion to the course.
Suggestions for the Future

The course was evaluated both by the College's traditional methods, and by a detailed survey constructed by this author. Evaluations of the course were overwhelmingly positive. Students suggested that a field trip to an engineering site could be included in the future, and it will be in the Fall of 1995.

Depending upon who enrolls, the syllabus will need to be modified each time the course is offered. When many undecided students participate, the balance of information should be about choosing a career and information on engineering; when more current engineering students participate, the focus should be on professional development.

As previously mentioned, the course will be offered for three credits in the future. This change necessitates meeting twice a week, for an hour and a half each session. It may be that one session each week will be a hands-on lab, with topics ranging from various types of engineering, to setting up an e-mail account, and even public speaking. Again, this will depend on whether the majority of the students enrolled are current or potential engineering students.

In the future, the course will be cross-listed as a women's studies course so that more students will be aware of it. More cooperative learning within the course is also a goal. Perhaps the biggest obstacle will be having the course count toward graduation for engineering students. However, even without these improvements, the course appears to be serving its purpose of recruiting and retaining women in engineering and applied sciences.

References