THE WISE MENTOR PROGRAM
AT CALIFORNIA STATE UNIVERSITY, NORTHRIDGE

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Introduction

The under-representation of women in engineering and computer science both in academic programs and the professional workforce is a well documented statistic.\textsuperscript{1} A recent publication by the Commission on Professionals in Science and Technology (1989) reports that the number of women earning baccalaureate degrees in engineering has been steadily decreasing since a 1987 peak and that unless new approaches are taken, women will represent less than 15 percent of engineering graduates in the foreseeable future.\textsuperscript{2}

In addition to this shortfall in women, we know that the college-age population is shrinking overall, and that while white men currently make up about 47 percent of the total workforce and 80 percent of the science and engineering workforce, by the year 2010 they will comprise less than one-third of the college-age population.\textsuperscript{3}

Therefore, it is clear that women represent a valuable resource to be cultivated in order to compensate for this deficit.

A crucial turning point for young women is their high school sophomore year. By the time they turn 17 girl's interest in natural science and engineering is significantly less than their male counterparts.\textsuperscript{4}

If changes are to be made in reversing these alarming and distressing trends, we must begin to understand why girls turn away from studying science and mathematics in such marked numbers during critical academic years, and therefore we must develop programs that can contribute to their behavior modification.

We know that equality of opportunity in the workforce does not yet exist. Women face real obstacles all along the way to a scientific career, including less institutional or federal support (than men) during graduate study, greater difficulty in obtaining a first position, less likelihood of finding full time work and finding work in their field, and less likelihood of finding an academic job in a tenure track. Additionally, women still continue to be paid less than
comparable men and this gap widens with age. These may certainly be reasons why women are participating less in science and are issues which our society must face. We also believe that in the earliest stages of their career development, when they turn away from math and science coursework, young women do not receive important information about science and engineering, nor do they benefit from positive role models to help them broaden their understanding of the exciting challenges and financial rewards that a scientific career can bring. The University can help change this situation by defining intervention programs to impact their future students.

The CSUN WISE Mentor Program

Background

The WISE (Women in Science and Engineering) Mentor Program at California State University, Northridge (CSUN), was developed in 1988 followed by its first offering in Fall, 1989. The initiation of this program was in response to the growing national, and our local, concern about the need to replenish the diminishing pipeline of qualified undergraduate students interested in an engineering or computer science career.

The Mentor Program became a component of an already well established umbrella program with various annual activities designed to promote the recruitment and retention of women students in engineering and computer science. Among these are a career conference, a publication, sponsorship of two student organizations, SWE (Society of Women Engineers) and WISE, scholarships, as well as personal and career counseling. The umbrella program is housed in the School of Engineering and Computer Science and is directed by Tobi A. Roffman.

Detailed Program Description

Goals. The Mentor Program is designed with two goals in mind. The first is to provide an informational and inspirational experience for high school girls by broadening their understanding of both the academic and professional worlds of engineering and related fields with the hope of impacting their decision to continue studies of mathematics and science at the pre-college level and, engineering or computer science at the college level. The second goal is to offer a career enrichment and leadership experience for CSUN junior and senior women majoring in engineering or computer science by fostering their understanding of and reinforcing their commitment to their majors.

Mechanics. CSUN students register in a formal course, Engineering 396, Women in Engineering and Computer Science: Career Issues and Exploration, which meets for 2.5 hours once per
week and for 15 weeks. Eligible participants receive a personal letter from the course instructor explaining the program and inviting them to enroll.

Each semester one local area high school is selected to participate. The course instructor meets with the high school college counselor and mathematics and science teachers who identify eligible female students who might have an interest in this program. The course instructor then holds an informational session with the high school girls concerning program requirements and objectives. At this time it is made clear that this is not a recruitment program for our University, but an opportunity to learn about career fields which they may never have considered seriously. At the close of this meeting, those interested are asked to complete a biographical questionnaire which becomes the final selection tool.

**Course Syllabus.** For the first 5 weeks of the semester, the class meets seminar style with only the CSUN students. During the first several class meetings the concept, practice, and value of mentoring is examined; for example, what is a mentor, and how can one effectively use mentors in various stages of professional development. Additionally, there are discussions of various career issues which are of mutual concern to both the instructor and the students, and current literature is frequently used to initiate discussion topics. Students also spend the early weeks in the semester preparing an Outreach talk on engineering to be presented to a middle school or high school of their choosing. A guest lecturer from the CSUN Department of Speech Communications provides the structure for their talk, while a graduate student from this same area critiques and polishes their performance. Students may present individually or as teams and all students are encouraged to participate in the reviewing process. Later in the semester CSUN students meet with working professional women engineers and computer scientists in order to benefit from their experiences in the workplace.

Interactive sessions with the high school students take place at either the University or a field trip location. Students are transported to and from their home campus by bus and with supervision by the course instructor. The first session with the high school participants occurs during the sixth week of the semester. Students meet their mentors and become acquainted over pizza and sodas. They enjoy informal discussions, followed by a tour of the Engineering Building.

Additional meetings with the high school students are of two types. The first is **hands-on workshops** conducted at the University, designed to introduce the students to different fields of engineering and computer science. The second type is **industry**
field trips where students have the opportunity to hear from engineers and scientists and explore their work environment. University sessions are conducted by engineering and computer science faculty, while field trips are arranged in cooperation with local, private and government industry. The Southern California area is abundant with a rich and varied representation of the engineering industry and companies are very interested in participating in this program.

Course Requirements. CSUN students are required to keep a experiential journal, recording their personal insights and impressions of the course as it progresses. They are also required to make an outreach presentation, attend sessions and meet their mentoring responsibilities.

High School participants are required to complete the application questionnaire and attend sessions. With an approved absence they may miss one session and still be recognized as successfully completing the program.

Recognition Ceremony. A ceremony honoring all the student participants is held at the last class meeting of the semester. Parents, faculty, and industry representatives are invited to attend - and they do. At this formal ceremony high school students receive a quality certificate recognizing successful completion of the program. All students receive a program keepsake, unique to the semester in which they participated. Tee shirts and personalized key chains have been awarded as mementos thus far. The ceremony is presided over by the course instructor and the Engineering and Computer Science Dean, and a reception is held to allow for some closure to occur between the two groups of students. The recognition ceremony is an important ritual in this type of program for it provides an opportunity for participants to gain a sense of pride in their accomplishment and it invites relatives and friends of the students to witness this achievement. Students leave this program on a real high!

Assessment. Both CSUN and high school students submit written evaluations at the end of the semester. While these evaluations may be anonymous, most choose to sign them.

Long term plans are underway to survey the high school participants annually, tracking their academic paths and career goals through college.

Participants

Thirty-seven high school students and 12 CSUN students have completed the program thus far. The high school students ranged in ages from 15 to 17 and represented grades 9 through 12. Representation according to ethnicity was as follows: Caucasian (47 percent), Asian (43 percent), Black and Hispanic students (10
percent combined). A plan to attract greater numbers of under-represented minorities is being developed.

Summary and Conclusion

The WISE Mentor Program was started at California State University, Northridge in the Fall, 1989. The program brings the University, area high schools, and local industry together in a cooperative venture to expose high school women to the fields of engineering and computer science, offers a career enrichment opportunity to junior and senior women in the School of Engineering and Computer Science, and provides industry with an informed and enthusiastic group of future engineers and computer scientists.

The high school age group has been identified as a major group to impact since this is where women, in particular, lose interest in science and mathematics. While the program is too new to truly measure its efficacy, the results thus far appear promising and with further growth it can have an influence on women's career choices. Intervention programs of this nature can be used to make the kinds of changes that, as a society, we must make if we are to face the scientific and technical demands of the decades to come.

References