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Engineering Openings—Women Wanted

During the first week of classes in 1985, when I started teaching at Ohlone College, two young women from my graphics class came to my office and said they wanted to take my statics class, but they did not have the prerequisite. "Oh," I said, "What's your grade point average?" "Four O," they said. "You've got all A's, both of you?" I countered in wonder. "Yes," they said. "Well, go look at the textbook and if it looks okay to you, I'll see you Thursday," I replied.

The next time I saw them was in graphics class, not the statics class. They told me, "We looked at the book and decided we don't have the time to do all the problems." "There are 100 problems at the end of every chapter, and I only assign about 10 a week," I replied. They were adamant: "We don't care what is assigned; we do all the problems at the end of the chapters." Looking back, this was the beginning of my involvement with women in engineering. They left in the spring with 55 semester units and graduated two years later from the Electrical Engineering and Computer Science departments of the University of California, Berkeley.

I began to notice that my female students seemed to ask different types of questions than men asked; they were not as concerned about revealing what they did not know. They wanted to get everything right. There was usually only one woman in every class, rarely two. Since the female engineering students I knew were so good, it seemed odd there were so few. I read what I could find about women in or out of engineering and decided they needed a club to facilitate *networking*—a word that came up repeatedly in articles about women in engineering.

Feeling certain that the club would be more successful if started by the students, I circulated a flier in the engineering and math classes, suggesting the advantages of networking. In a few days a young woman knocked at my door and said, "We need a club." Her name was Wendy Chan, and she became the first "Chief Engineer" of the Ohlone Women Engineers club, OWE. I became the advisor. I recruited a female math teacher to be co-advisor since we had no female engineering teachers.

Inviting women engineers to campus to speak was the OWE's initial activity. I gave extra credit to all who attended from my classes. These speakers proved to be popular and gave me the idea to use women engineers as guest speakers in my Introduction to Engineering course.

The club took advantage of the outreach offer by the SWE, the Society for Women Engineers student chapter at the University of California, Berkeley, to send some members to Ohlone to explain how to get into the university and how to stay in. We asked for female community college transfer students so that our students could imagine themselves making such a transfer. Akiko Inoue, a transfer from Ohlone who was a former chief engineer of our club, our outstanding engineer in 1993, and a winner of a $1,000 SWE, Santa Clara chapter, scholarship, returned last year to tell about her experiences. This presentation was well-attended. I admit to feeling proud.

The club arranged for industrial field trips to IBM, Logitech, and Silicon Graphics. We made certain in advance that we would see and could talk to women engineers. I now use the same approach for my "Intro" class field trips.

In the late spring, OWE sponsors the Engineers Feast, a potluck dinner designed to celebrate the successful transfer of our engineering students to various four-year schools. In the past three years we have had 21, 29, and 27 students transferring; and of those 9, 5, and 5 repectively, were women. These are minimum numbers as there is no formal tracking of transfers. This feast features a successful practicing woman engineer as the main speaker. Awards are given for the traditional "Most Likely to Succeed" and the not-so-traditional "Most Helpful to Other Students."

I discovered that Purdue had more women engineers than any other university, and one of the female professors encouraged me to copy their Women in Engineering course, which she felt was helpful in retaining women students. It was easy to find a super female engineer who was eager to teach the course.

Each semester the Women In Engineering Seminar must recruit students to avoid being cancelled. I am convinced that contact with women engineers and networking are the two most important means of recruiting and retaining women engineering students. This course provides ample opportunity for both. However, even beginning engineering students are not inclined to take courses that are not required. Putting up posters

and mailing fliers were not successful, so I began looking for a new way of bringing the course to the attention of the women students (who are more than 50 percent of all students). I was aware of our own Women In Literature class and our Women's Health class, so I initiated a Women Studies Program that included our course. Now students register for our Women In Engineering Seminar class in the Women Studies Program.

One day when I was discussing recruiting and retaining women engineering students with a local high school vice principal, I learned that her daughter was studying engineering at the Massachusetts Institute of Technology (MIT). This young woman had reported to her mother that even the rooms at MIT reeked of masculinity. I decided to make a tour of our classrooms. I found our engineering rooms undecorated, relatively joyless and stark, in contrast to the considerably more interesting rooms that women teachers call their own. By putting up calendars and posters and strategically placing a few plants, the rooms look more colorful, cheerful, and diverse.

In the spring of 1993, I acted on an idea that had been simmering for some time. I formed an Advisory Committee for Women in Engineering: nine engineers, a mathematician, our public relations head, and a high school counselor, all women, and myself. They are anxious to help provide more women an opportunity in engineering. Each of our women engineering students has had a telephone call from one of these women engineers who are available to students to answer questions and provide general support.

The co-advisor of the club organized a reception for our new female engineering students so they could meet the women on the committee and other women engineering students in the college. At this reception, our seminar teacher awarded an Engineering Scholarship and a Women's Engineering Scholarship, $250 awards which she personally funded. One committee member is exploring the possibility of generating additional scholarship money from her company. A math teacher at the college has donated $500 to the Ohlone Women Engineers Scholarship Fund.

Since I have become more involved with retaining and recruiting female students, I have increased my criteria for textbook review. I look to see how many women are in the illustrations and what they are doing. I check the text to see how or if the question of why there are so few women in engineering is addressed. Additionally, when I lecture, I make sure I use both genders of pronouns and that problems are written using both genders. I am careful to know the names of my women students, and I call on them in class. When I see articles about successful women engineers, such as Sheila Widnall, the Secretary of the Air Force, I post them on bulletin boards or circulate them. I joined SWE and WEPAN, Women In Engineering Program Advocates Network, so that I would not miss any new ideas. To facilitate networking, I started a Who's Who In Engineering, class photos, and a student phone list.

I believe the student population of women engineers has leveled out at about 15 percent because we are not recruiting the women who would rank in the second, third, and fourth quartile of engineers. The women students near the top of their class in science and math are being counseled to go into engineering, but those who rank lower are more likely to be channeled toward nursing or teaching. The community college provides a natural route for these lower-ranked students to go into engineering. At Ohlone we have several math courses below calculus and an assessment test to place students for success. We have a math lab that is open all day and at night, started on a volunteer basis several years ago by the OWE co-advisor, but now staffed by one teacher and an assistant. A female math teacher conducts testing and math anxiety classes.

Where do we go from here? We have begun a program in which every female engineering student has the opportunity to have a practicing female engineer for a mentor in the discipline of her choice. We plan to have a brochure to explain to those young and not-so-young women, who are potential engineers, that Ohlone has the welcome mat out for them. We have developed a good model for retention and hope that by enabling our women students to succeed, others will be convinced that they too can become engineers. Community college is the right place for some of them to start.

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