

A SUPPORT SEMINAR FOR FRESHMAN WOMEN IN ENGINEERING

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Introduction

The support seminar for women in the Department of Freshman Engineering (ENGR 194: Women in Engineering) has been taught at Purdue for thirteen years. It was introduced as an experimental course funded by a grant from the U.S. Department of Education under the Women's Educational Equity Act in the spring of 1977. Since 1980 it has been taught by Dr. Jane Daniels, director of the Women in Engineering Program. Currently the responsibility falls to the author who is the assistant director. This seminar is the primary institutionalized retention activity which has the salaries of the directors and reproduction of materials covered by the department. Industry funding is used for additional expenses such as travel of guest speakers without corporate sponsorship. For the last ten years approximately 45% of the freshman women students in engineering have enrolled in the seminar while another 5% have been excluded due to space limitations.

Format

Engineering 194 is an elective one credit course, meeting one hour a week for 15 weeks. It involves a series of guest speakers addressing academic, personal, and career issues in a lecture-discussion format. These issues are important for all freshmen students, but are presented so that they apply most specifically to freshman women in engineering. Students choose whether they will take this seminar for a letter grade or on a pass-fail basis. Their grade is based on attendance and on a written assignment. They choose the written assignment from one of three that are suggested in the syllabus. This may be a book report on recommended readings, a journal kept throughout the semester, or a report on an individual company visit or group plant trip.

The first session has considerable weight for setting the tone for the entire semester. Two things are accomplished. First, as soon as the syllabus with the objectives for the course has been presented, the students are invited to discuss their questions and expectations. To ensure that everyone's concerns are recognized, at the end of the class all the women are asked to turn in two or three questions that are on their minds as they begin the program. All of their questions are read and noted. During the semester, the speakers are given guidelines which include these concerns. Secondly, it is imperative to set some time aside for group building in order to establish a supportive environment from the start. The students begin to realize that this classroom is a unique place. It is a place where learning will occur, but learning of a different type. In class, we emphasize that this type of learning is not limited to

facts; it is not solely quantitative as is the greater part of the freshman curriculum. The learning opportunity is distinctive; it involves immersion of all the faculties--not intellect alone--in finding out about the self as the students find out about the paths other have taken. They will learn from the speakers about decisions taken in selecting majors, about critical choice points in life, about the pitfalls as well as the peaks.

To follow up on the group building, the next time the class meets a list is passed out with names, telephone numbers, and courses that the women have in common. The purpose of such a list is to encourage students to form their own small groups to study together and support each other.

Before specifying the objectives for the freshman seminar, it is necessary to point out how it differs from other freshman seminars.

Differentiation

Although our goals are holistic, we are realistic in knowing there is only so much that can be done in one semester. Our course is not a Freshman 101 nor an Engineering 100 course. Freshman orientation courses very often encompass six dimensions, namely, academic, vocational, social, physical, emotional, and spiritual.¹ Frequently they include units on study skills, research and writing skills, career information, physical fitness, building social relationships, and values. However, in the Department of Freshman Engineering we already have four courses which treat the academic and vocational aspects in depth. First, the Counselor-Tutorial program provides extensive academic assistance for the required math and science classes for all who need it. Secondly, the Engineering 100 course constitutes an introduction to the engineering profession. It is required of every freshman engineering student at Purdue. In this course the academic requirements and career opportunities of all the areas of engineering available at Purdue are described. For students who remain undecided about engineering, the Engineering Career Development course is suggested. This is an intensive, limited enrollment, career planning and decision making course. Finally, there is a seminar for Minorities in Engineering. Therefore, in the Women in Engineering seminar we are in a strong position to concentrate on topics more pertinent for women.

Objectives

The seminar has been designed to meet five basic objectives.

1. To increase confidence and develop skills for the transition from high school to college

The first objective is to ease students through the transition from high school to college in light of the developmental needs of the whole person. Our freshman women students, despite their impressive record of academic achievement in high school, range from being a little bit anxious to being overwhelmed at the many changes and choices awaiting them. Many of these women have graduated at the top of their high school class. When they arrive at Purdue, they are faced with a much more competitive environment. Moreover, they no longer have a supportive home situation at hand nor old and trusted friends to discuss personal problems that inevitably arise in this period of transition. Hence, our responsibility is to provide:

- a supportive environment and opportunities to interact non-competitively with their fellow female students;

- information on resources available on campus for academic and personal difficulties;
- sessions on the academic and personal competencies needed to adjust to the demands of an engineering education and career;
- sessions on developmental issues such as increasing assertiveness and maintaining positive self-esteem and integrity.

We also urge them to keep a journal as a way to manage and monitor their emotions. Experience has proved that this is a beneficial means for charting growth and development, for attaining identity through knowledge of the self.

2. To provide information on careers in engineering

Women graduates from the various schools of engineering speak to our students on career paths in engineering. Some of the topics they address are similar to those covered in Engineering 100, namely, what do engineers do, what are current career opportunities, what constitutes a typical day. The difference is that, in our seminar, the answers provided are from the personal perspective of the woman speaker. She may begin: "Let me tell you why I chose engineering. Let me explain what I do. These were my options and opportunities as a woman."

3. To increase awareness of the flexibility of engineering training.

The emphasis here is on the variety of career possibilities available to an engineer. Our speakers relate what else one can do with an engineering degree. Those Purdue graduates that have shifted to jobs in management, in law, or medicine explain the spectrum of choice in industry, in government, and in academia.

4. To provide effective role models

Women do not get to see females in positions of authority as often as they see males in positions of authority. Even in the classroom, 73% of faculty members are male while 90% of all full professors are male. Women faculty largely hold positions as instructors or have untenured, temporary appointments. ² Among engineering faculty, only 3.4% are women. ³ Thus, our speakers serve as role models. Most are professional women, practicing in engineering and other fields; several of our speakers are women professors and graduate students; the remainder are undergraduates and student services personnel. In talking about their career choices, they are very frank about some of the hardships they faced. And yet, typically they have remained enthusiastic about their work and are eager to offer encouragement and answer all types of questions.

5. To present a holistic approach to life as a woman engineer

Speakers are asked to take a holistic approach, to bring all aspects of life into consideration: professional as well as personal. Our women speakers are very effective in demonstrating that there exist as many ways for living a full life as there are determined individuals. This may be life as a single person or life with a family. Several dual career couples have come in with their children to talk about the choices they made. Most of our speakers take the balanced approach. They discuss work, family, and leisure

activities. Seeing their real life success gives our freshman women courage and confidence that they can make it too!

Speakers

Speakers constitute the strength and core of our course. They are always on center stage. As mentioned earlier, since each engineering discipline is already covered in the ENGR 100 seminar, we can carefully choose dynamic role models for the engineering fields and for the related or non-traditional areas. We try to have a culturally and racially diverse group of speakers. We also try to have speakers in various positions (e.g., managerial or personnel, technical sales, construction) and at various levels of accomplishment. Our speakers are also representative of the general student body in the sense that some of them excelled in their studies while others had a more difficult time.

Panels

The panel discussions are among our most popular offerings. Three separate panels are held during the semester--industrial, student, and graduate.

Industrial Panel

Articulate industrial spokespersons address but are not limited to the following issues: a. reasons the corporations they represent encourage women to pursue engineering; b. opportunities for engineers in their corporation; c. support programs that might exist for women in their corporations; d. experiences in college that may prepare our students for employment; e. specific recommendations these industry representatives have for young women who are just beginning to commit themselves to the study of engineering.

Student Panel

The student panel is geared to answer questions and allay fears regarding the transition from high school to college. This includes concerns on their academic performance (How do I keep my self-esteem now that I have failed my first math test ever?), on personal issues such as roommate problems, or questions concerning the pros and cons of pledging sororities. Some of our most highly rated panel speakers are not those that recount a list of their successes, but the women who are able to talk about that grade of D on their first test in physics. They are the ones that help put the college experience in perspective. Purdue is a rigorous school academically. There is no question that many of the new students will be getting grades below their pre-college performance. The question is how will they handle it? Studies for academic success time and again have emphasized that, next to motivation, realistic appraisal is what it takes to get the job done. Our women students talk about the real struggles that the freshman will be facing. They reveal how they did not lose heart, how they had to cut back or push forward in order to accomplish their goals in the classroom or in the coop program. Our student panel is usually an exhilarating experience.

Graduate Panel

In recent years we have made strong efforts to emphasize the importance of presenting graduate study as a desirable option. This is stressed in our senior seminar but we realize the urgency for starting as early in the pipeline as possible. Hence, this panel for the freshman women is held for three purposes: a. to impart an awareness of the advantages and disadvantages of graduate study; b. to motivate students to consider graduate studies as they listen to accounts of successful personal experiences by the

panel participants; c. to emphasize the flexibility of the academic profession and its changing character in order to offset reported discouragement. ⁴ For this panel, we have one female engineering professor and two or three graduate students. At least one student will be pursuing an advanced degree specifically in engineering while other students will have earned their Bachelor's in engineering but have achieved degrees such as the popular Master's in Business Administration. Given the scarcity of women professors and the fact that only 6% of undergraduate women planned to become college professors ⁵, it is important to intensify our efforts to stimulate some freshman women to choose the academic profession.

Plant Trip

The plant trip is another empirical learning experience and a good break from sitting in the classroom. Last fall we visited Eli Lilly Tippecanoe Labs. This fall we plan to tour the new Subaru-Isuzu Automotive facilities. It should be pointed out that organizing a tour for 160 people can be problematic because of class schedule conflicts and logistics. Moreover, not all of the students indicate the same degree of interest. Anywhere from one third to one half of the students sign up. Many that sign up have an interest in the specific areas of engineering that the plant involves; others simply want to know how plants work. The remainder of the class stays to hear the speaker or panel planned for that day.

Other Resources And Support Groups

We believe it is important to broaden the support base offered by our seminar with exposure to various student services on campus. These include the student hospital, the psychological service center, career resource center, and placement office. Freshman may have read about these in the university catalogs but they profit from seeing and hearing a representative at a special session. At this informative session, they also hear a talk on some issue of self-esteem such as assertiveness or weight control excesses and receive a list of workshops on these and similar topics. Finally, this session is an opportunity for the women to enter into animated discussions on personal problems such as roommate conflicts. Our weekly luncheons are another effective support system. Every week before the class meets, there is a luncheon scheduled with the speaker. Students have the opportunity to sign up for one of these if their schedule allows it. Most of the women relish the chance to interact with a professional on a one to one basis. Some of them have never before discussed their aspirations with anyone other than a parent or teacher. There is no question that the benefits of this type of interaction are mutual. The speakers are impressed with the questions and confidence of the students; the students with the respect and care conveyed by the speakers.

Follow-up Seminar In Senior Year

At Purdue we offer Women in Transition (ENGR 195W) both to increase the effectiveness of the initial freshman seminar and also because senior women on the point of entering the work force are faced with quite different issues. The format and requirements of the course are the same; many of the speakers are the same; the key difference is in the content. Some of the other topics dealt with in this seminar are: personal awareness (self-knowledge, personality type, managing stress); practical skills (resume writing, interviewing skills, financial planning); professional issues (professional registration and license, membership and leadership in professional societies).

Evaluation

Fidler and Hunt provide ample evidence for the effectiveness of freshman seminars.⁶ This has been the case with our seminar. At its inception it was field-tested for effectiveness by its project director, Dr. William LeBold.⁷ Subsequently it has been evaluated each semester. An extensive evaluation is conducted during the final session. In a five page survey the students are asked to rate the following areas: perceived importance of course objectives, extent to which course objectives were met, quality of each session, format and content of course, effectiveness of instructor. One page is intended for written comments regarding ways to improve the course and specific reasons they enjoyed or disliked speakers. The seminar is modified on the basis of evaluation results. These evaluations confirm that this is an invaluable class both for freshman as well as seniors. Last fall, the freshman women ranked an awareness of the career possibilities in engineering and of combining work and family as being their two major concerns. Judging from their comments, it is also a class which they find enjoyable. Most women who leave college do so because of unsatisfactory experiences not because of poor grades.⁸ This seminar is one way to increase retention by increasing student satisfaction.

References

1. Jewler, A. J., "Elements of an Effective Seminar: The University 101 Program," in Upcraft, M.L., Gardner, J., and associates, **The Freshman Year Experience**, Jossey-Bass, San Francisco, 1989, pp. 198-215.
2. American Council on Education, **Trends and Patterns: A Study of Enrollments in Higher Education, 1970-79**, ACE, Washington, D.C., 1982.
3. Vetter, B. M., "Replacing Engineering Faculty in the 1990s," **Engineering Education**, vol. 79, no. 5, July/Aug. 1989, pp. 540-546.
4. Barber, E.G., Morgan, R.P., et al., "To Pursue or Not Pursue a Graduate Engineering Degree," **Engineering Education**, vol. 79, no. 5, July/Aug. 1989, pp. 550-555.
5. Baum, E., and L. Appelbaum, **The Cooper Union 1989 National Survey of Women Engineers**, The Cooper Union for the Advancement of Science and Art, New York, 1989.
6. Fidler, P., and M.S. Hunter, "How Seminars Enhance Student Success," in Upcraft, M.L., Gardner, J., and associates, **The Freshman Year Experience**, Jossey-Bass, San Francisco, 1989, pp. 216-237.
7. LeBold, W.K., **Putting It All Together: A Model Program for Women Entering Engineering**, Women's Educational Equity Act Program, U.S. Dept. of Education, Newton, Ma., 1982.
8. Evangelauf, J., "Education Research Seen in Ferment; Retention Studies Called Too Narrow," **Chronicle of Higher Education**, May 9, 1990, p. A-18.