

DEVELOPING AND IMPLEMENTING A HIGH SCHOOL ENGINEERING CAREER DAY

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INTRODUCTION

The Women in Engineering Program at the University of Colorado at Boulder conducts High School Engineering Career Days to interest 9th-to-12th grade women in engineering as a viable career option. After hosting and evaluating three such programs, the CU-Boulder WIEP believes that it has found an excellent combination of presentations and demonstrations that maintains interest and piques curiosity about engineering.

The primary audience is 9th-12th grade women. Acknowledging that these young women need guidance from their parents, teachers, and counselors, we encourage adult participants, and plan a special session for them within the program.

The program features four types of presentations: (1) an entertaining physics demonstration, (2) a discussion with a female engineering student, (3) a panel presentation by professional women engineers, and (4) hands-on demonstrations by engineering faculty and graduate students. In place of the panel of professional engineers, the adult participants learn about admissions, financial aid, and housing. Participants may also take an optional campus tour.

This paper describes the program, suggests a budget, outlines a timeline, and discusses considerations and problem areas.

Purpose of Conducting an Engineering Career Day for High School Women

- To introduce engineering as a viable career option to 9th-12th grade girls;
- To provide a "taste" of engineering and pique curiosity so girls attend other, more in-depth, engineering visitation programs and continue to take math and science courses to prepare for college;
- To provide female engineering role models, both students and professionals;
- To expose girls, parents, teachers, and counselors to the CU-Boulder campus; and
- To provide parents, teachers, and counselors with up-to-date, accurate information with which to best advise and guide their students.



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THE PROGRAM

A typical Engineering Career Day for High School Woman is held on a Monday, during the regularly scheduled semester. After trying several different arrangements of time, we determined that the following schedule works well:

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| 9:00 - 9:30 am | Check in/pick up packet at University Memorial Center |
| 9:30 - 9:50 am | "A Taste of Class" Professor John Taylor (Mr. Wizard) |
| 10:00 - 10:55 am | "A Day in the Life" of an Engineering Student |
| 11:10 am - 12:10 pm | Panel Discussion: For Students: Professional Women Engineers For Adults: Admissions, Housing, and Financial Aid |
| 12:15 - 1:05 pm | Lunch/Remarks from the WIEP |
| 1:05 - 1:20 pm | Walk over to Engineering Center |
| 1:20 - 1:40 pm | Hands-on Demonstration 1 |
| 1:45 - 2:05 pm | Hands-on Demonstration 2 |
| 2:05 - 2:30 pm | Walk back to UMC for Campus Tour (optional) |
| or | |
| 2:15 pm | Minority Students meet with MEP staff |

Description of Activities

"A Taste of Class". Professor John Taylor, known as Mr. Wizard, demonstrates physics principles using common, everyday objects. For example, he helps students visualize sound waves using a radio, a coffee can, and rice. He pulls a tablecloth off a table, and explains why all the china, glassware, and silverware do not fly off with the tablecloth. Other entertaining examples of physics are provided.

"A Day in the Life" of an Engineering Student. Each group of 20-30 participants (both students and adults) meets with one of our female engineering students. Our students talk about their class schedules, their study time, social life, professors and teaching assistants, the transition to college, etc., and answer questions about college life, engineering careers, and any subject of interest.

Panel Discussion: Professional Women Engineers. Four professional engineers from diverse backgrounds, family situations, and employment situations speak with the students about careers in engineering, blending career and family, what it's like to be a woman engineer, what courses are recommended in college, and other issues of interest.

Panel Discussion: Admissions, Financial Aid, and Housing. Representatives from those campus units discuss the admissions process, the financial aid process, timelines and deadlines, requirements for admission, college costs, housing costs, various housing options on campus, and other questions brought up by the adult participants.



Lunch. We provide a served lunch of lasagna, including salad and dessert. We assign one of our female engineers or another speaker to each table, to facilitate discussion of the morning events. Door prizes are awarded at lunch. Staff from the Women in Engineering Program briefly comment on the program's activities.

Hands-on Demonstrations. Faculty and graduate students in the College of Engineering developed nine hands-on demonstrations, in a variety of engineering fields. The participants (both students and adults) are divided into nine groups, each escorted by one of our women engineering students. Each group participates in two demonstrations, carefully selected to maximize exposure to various engineering fields. Participants are randomly assigned to groups.

Campus Tour. This tour is offered daily by the Office of Admissions, and participation is optional. About 20% of attendees choose to go on the tour. Many career day participants must return to their schools or homes, as far as 5 hours away.

MEP meeting with minority students. The Minority Engineering Program at the University of Colorado at Boulder is recognized as one of the top programs in the country. Minority students have the option of meeting with MEP staff to talk about the support offered by the MEP.

The Budget

Hosting a Career Day costs about \$10-11 per participant. We charge \$5 for each participant (adult as well as student), and one of our corporate sponsors underwrites the other expenses. We provide a served lunch, but have cut out an early morning snack. We provide a packet of information and a pencil. We give door prizes at lunch, consisting of donated goods as well as inexpensive purchased items with CU-logos. We incur costs for refreshments for our undergraduate students volunteers, when we train them for the presentations and when they put together the packets. We also provide meals and parking for all our speakers and volunteers.

It is important to budget funds to cover the costs of complying with the ADA (American Disability Act). For example, you must provide sign language interpreters for deaf participants. This can cost \$500 for a day-long event.

You may also choose to pay for school buses - about \$200/bus - to transport groups of girls who have no other way to get to your program. We do not provide transportation, nor do we pay for parking. We do arrange for 1/2 price parking in a convenient location.

Advertising the Event

We send four letters to each public high school in the state of Colorado (270). Letters go directly to the department chairs of each math and science department,



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principals, and presidents of the PTO's.

Attendees

To maintain the quality of the program and small group sizes, we limit student registration to about 180. Participants in March, 1994 were 9th-graders (24.8%), 10th-graders (19.8%), 11th-graders (41.4%), and 12th-graders (14.0%). There were about 35 adult attendees, consisting of parents (60.9%), teachers (26.1%), and counselors (13.0%).

Timeline

Time before planned event:

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| 3-6 months: | Select date, reserve facilities, solicit financial support. |
| 3 months: | Begin soliciting volunteer speakers and hands-on demonstrations |
| 2 months | Send letters to math/science teachers, principals, and PTO's, soliciting participants |
| 6 weeks | Confirm professional speakers and hands-on demonstrations by phone or email. Request biographical information and descriptions of demonstrations. |
| | Solicit information and brochures for packet, door prizes. |
| 5 weeks | Begin preparing written materials to be included in packet |
| 1 month | Send confirmation letters to speakers, giving directions, parking validations, etc. |
| | Deadline for receiving registration forms from participants |
| | Confirm engineering student volunteers/speakers |
| 3 weeks | Send confirmation letters to participants with maps, parking validations, instructions. |
| 2 weeks | Train student volunteers |
| | Purchase materials for packets, door prizes, etc. |
| 1 week | Stuff packets, make audiovisual aids, organize paperwork and all materials to have on-site, |
| | Provide final numbers for lunch |
| | Request and confirm special audiovisual needs, tables, etc. |
| 1-2 days | Load boxes in car, lock in room on-site if available and secure. |

After the event:

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| 1-5 days | Send thank-you notes to ALL volunteers, students, faculty, professionals, etc. (copies, when applicable, to deans, department chairs, supervisors, student files) |
| 1 week | Analyze evaluations, follow up on phone calls, questions, etc. |
| 1 month | Debrief - determine what worked and what didn't and make recommendations for future events. |

EVALUATION

Evaluation is a critical component of any career day program. You must be able to determine successful parts of your program and problem areas. Design your evaluations so that you get specific information about what you need to improve, which speakers should be invited back, which demonstrations should be repeated or modified for the audience, etc. You will most likely have to provide results to your financial sponsors and use them when writing your annual reports.

Typically, we ask participants to rate the speakers on a scale of 1 to 5. We also ask several open-ended questions and welcome comments and suggestions. We inquire about their choice of career and school, and if our program has any effect on that decision. Hands-on demonstrations are evaluated as "too easy," "too difficult," or "just right." Participants are also asked if demonstrations are interesting and if they learn from them.

PROBLEMS

Facilities

Because we conduct our Career Days during the week, we have limited access to good facilities. We absolutely cannot get classroom space. We use the University Memorial Center, which has a 250-seat auditorium. Unfortunately, the temperature (warm) and acoustics are not great. We will need to work more closely with facilities staff in advance to optimize conditions.

Student Workers and Volunteers

The Career Days are supervised by the WIEP Program Coordinator, and carried out by two student employees. Since being students is their first priority, there are times that certain tasks do not get done in a timely manner. In addition, because we hold our career days on Mondays, we have a difficult time getting enough volunteers who do not have classes during the times we need them.

Presenters

A common problem is the unpredictability of our students. We train our students on things to do and not to do. We talk to them about being realistic, but avoiding "negative" talk. We ask the students to present the balance in their lives, talk about how much they study, what they do in their spare time, etc. Unfortunately, they still sometimes say things we would prefer that they not say.

We are also building our network of professional women speakers. We sometimes find that the high-school audience and the speaker are not necessarily well-matched.



Audience

A small number of students are not interested in science, engineering or even college. They attend to get out of school for a day (one school brought 60 students). We ask ahead of time that teachers screen for this, but this may be the only opportunity for some of these girls to visit a college campus. While we certainly hope that this experience will help guide these young women towards improved career access, our concern is the number of students we must turn away because our program is full.

We tend to have more adult participants than are registered in advance. We state clearly that they must register and pay \$5.00, but for some reason, they don't always think this applies to them.

Each time we conduct this program, there are requests to bring boys. In addition, there is concern that this program may be discriminatory. We do NOT allow boys to attend, for the usual reasons. We DO provide information about ALL the other visitation programs on campus that are open to boys. There are ample opportunities for boys to acquire the same information that we provide to women (except of course, what it's like to be a women in engineering!).

Things that Did Not Work!

There are some terrific videos available for career guidance. In one Career Day we showed the Cornell video, *She's the Engineer*, while another time we used the video *Engineering: Designing Tomorrow's World* from University of New Brunswick, Canada. Both videos, which are among the very best around, flopped dramatically. High school girls do NOT want to sit still and watch them.

For two previous high school career days, we offered two professional panels. The girls became bored! One hour - and one panel - is sufficient.

CONCLUSIONS

The Career Day program that works best at your institution will depend on your objectives, your audience, resources available, facilities, etc. We make the following recommendations:

- Keep the day simple. Offer a good selection of activities, but don't make changes too complicated. Make the day only as long as a typical day at high school.
- Feature your female engineering students as much as possible.
- Make use of existing resources, such as campus tours and faculty presentations

We welcome inquiries, and are happy to provide guidance on specific topics or activities.



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