

## **HIGH SCHOOL OUTREACH PROGRAM (HOP)**

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### **INTRODUCTION**

In 1994, the Texas A&M University's WEST Program conducted a Classroom Climate Survey<sup>2</sup> to determine why women selected engineering (among other information). When asked, "Why did you choose your major field," the top three reasons for men and women were: personal enjoyment or interest in the field; good pay; and availability of jobs. The data also indicates that twice as many women as men report that a high school teacher or counselor encouraged them into the field.

Additionally, the "Harris Poll" (1998)<sup>1</sup>, conducted a study on "American Perspectives on Engineers & Engineering." The data showed that Americans (n=1011) feel less well informed about engineers and engineering than they do about science and technology. The research also showed that the majority feels "not very" or "not at all well" informed about engineering and/or engineers. This indicates that an aggressive educational approach to inform high school students and teachers about careers in engineering is needed.

While there is only 10% female and 6% ethnic minority (African American, Hispanic and Native American) in the field of engineering, a larger percentage of these two groups are starting to study engineering in higher education. Still, increases in the number of students who study and practice engineering must be increased. High school Outreach Program (HOP) is designed to reach out to women, ethnic minorities and/or honors students, during their high school years.

### **PROGRAM DESCRIPTION**

The High school Outreach Program (HOP) pilot program began in fall 1999 with the combined support of Women in Engineering, Science and Technology Program (WEST), Multi-Ethnic Program (MEP) and Engineering Scholars Program (ESP). Housed in the WEST Program, HOP has quickly taken hold with a large number of students interested in the community building of going to their high schools. HOP is dual-faceted: 1) To encourage targeted students (women, ethnic minorities, and honors) at the secondary school level to consider engineering as a career, and 2) recruit more targeted students to study engineering at Texas A&M University. The remainder of this paper is dedicated to the discussion of the first goal of HOP.

Volunteers make their own arrangements with the high school class. Most choose to contact a favorite teacher while a few contact the administration directly. While most speak to one class during a typical class period, some students have spoken to an auditorium of students or at career day. Students also choose when to present. Most

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convenient is during the holiday breaks where high school is in class one week after and/or before TAMU finishes and begins.

They are equipped with a presentation packet that includes an overhead slide presentation, presentation note pages, three different evaluations and information covering the following areas: Dwight Look College of Engineering, scholarships, special programs and applications to Texas A&M University. Students are encouraged to prepare by reviewing the slides, making notes, and removing any slides they do not wish to address.

Three different evaluations are included in the packet: teacher, student, and presenter. Each evaluation is created to ask about the content and its' effectiveness, not to rate the presenter. Students are asked to return the presentation packet 5 days after returning to school.

## RESULTS OF THE PROGRAM

Forty-nine (49) students volunteered to visit a high school class. Of the forty-nine (49), twenty-nine (29) picked up a packet for the December holiday break. Twelve (12) students were actually able to present to a high school class.

### Student Evaluations

Of the evaluations that were returned, ten (10) sets of high school students completed the evaluations (N=130). Table A.1 shows the gender and ethnic breakdown of the students who returned the evaluations. The gender breakdown was very comparable; females, 53.85%, slightly dominated the audience while males consisted of 43.07%. Fifty per-cent (50%) of these students were Caucasian, thirty-four per-cent (34%) were African American, ten per-cent (10%) were Hispanic with the remaining six per-cent (6%) where either Asian American, Slovakian or choose not to respond to this question.

Table A.1	Female	Male	Unknown	Total
African American	28	17	0	45
Asian American	2	0	0	2
Caucasian	32	34	0	66
Hispanic	8	5	0	13
Native American	0	0	0	0
Other	0	0	1 (Slovakian)	1
Not Applicable	0	1	0	1
Total	70	56	4	

Table A.2 shows the response rate to the two main questions on the evaluation form: "Did today's presentation educate you about engineering?" and "Would you now consider a career in engineering?" Of the one-hundred and twelve (112) students who responded that the presentation did educate them about engineering, 28 were Caucasian

females, 25 were African American females, 8 were Hispanic females, 2 were Asian American females, 29 were Caucasian males, 12 were African American males, 5 were Hispanic males, 1 was a Native American male, and 1 was a Hispanic and Slovakian who choose not to disclose his/her gender.

Of the sixty-four students who would consider a career in engineering, the breakdown for females and males is very comparable (62.32% for females and 64.91% for males). Of these numbers the female group that responded highest by ethnic group was Caucasian (23) students followed by African American (17), Hispanic (2) and Asian American (1). A similar pattern shows for the males also: Caucasian (19), African American (14), and Hispanic (4).

Table A.2

Question	Yes	No	No Response
Did the presentation educate you about engineering?	86.15% (n=112)	9.23% (n=12)	4.62% (n=6)
Would you now consider a career in engineering?	49.23 (n=80)	46.92 (n=42)	3.85 (n=4)

In addition to the above two questions, we asked the respondents to list their top three career choices. Table A.3 shows the top 5 choices in the 1<sup>st</sup> career, 2<sup>nd</sup> career, 3<sup>rd</sup> career and overall career preferences.

	1 <sup>st</sup> Rank	2 <sup>nd</sup> Rank	3 <sup>rd</sup> Rank	4 <sup>th</sup> Rank
1 <sup>st</sup> Career	ENGR (33)	Medical (25)	Scientists (12)	Law/Education (9)
2 <sup>nd</sup> Career	ENGR (28)	Medical (23)	Lawyer (9)	Scientists (8)
3 <sup>rd</sup> Career	ENGR (21)	Medical (17)	Education (13)	Scientists (5)
Overall	ENGR (82)	Medical (65)	Scientists/Education (25)	Lawyer (21)

## Teacher Evaluations

Of the nine (9) teacher evaluations that we received back, all nine believed the presentation was effective. Individual comments included:

*"Very informative. Student response was great. Interest level high. Student questions implied lack of knowledge about engineering."*  
– Willowridge High School

*"In-depth and exciting."* – Forest Brook Senior High School

*"Did not 'sugar coat' the difficulty of engineering. Emphasized need to learn to study and for taking math and science courses in high school."* – Cuero High School

Seven (7) of the nine (9) teacher thought that the presentation was appropriate for their class and the age group of the class. The type of classes spoken too included: physics I & II, chemistry II, and English. In addition to speaking in the formal classroom (9), students spoke during college/career center presentation (1), student assembly (1) and lunch (1).

### **Presenters' Evaluations**

The presenters' evaluations (n=7) showed results similar to both the student and teacher evaluations. The presenters' comments included:

*"Liked 'informative information.' Students were receptive and questioning."  
- Mia*

*"Enjoyed. Would like handout detailing different ENGR majors at TAMU.  
Many questions regarding difference." – Jennie*

*"I wish I had more time!" – Omar*

*"Seemed to enjoy. Asked many questions about courses." – Angie*

Of the students who presented, five (5) were males and seven (7) were females. They spoke to a variety of classes including honors, all grade levels (together and separate, lunches, student assemblies, and college/career center presentations. The presenters were also asked for suggestions which included doing the presentations earlier in the fall; so interested seniors could have time to fill out an application to TAMU; give a small gift for students to remember the presentation by; and to scale back the presentation so students would have more time to ask questions.

### **SUMMARY AND FUTURE PLANS**

The High school Outreach Program has begun successfully. It has reached over 300 high school students from 12 different high schools in Texas, educating them about engineering. Currently the HOP staff is expanding the presentation packet that the presenters take with them. Additionally, we are creating two different presentations: 1) traditional classroom presentation (30 minute presentation with 20 minutes of question/answer time and 2) college/career center presentation (15-20 minutes of presentation with 10-20 minutes of question/answer time). These changes are due to the feedback we have received regarding the difficulty of using one presentation (originally designed for a traditional classroom) for speaking to a larger group of people, in a shorter amount of time.

One of our biggest difficulties has been to receive back the evaluations completed, in particularly from the presenters. We plan to expand the evaluation process to include a more in-depth discovery of the benefits of HOP on the students, teachers and presenters and strategically stress the importance of the evaluations.

The future of HOP is grand. Our goals are to expand the number of students who volunteer to speak with a high school class, improve the information the students receive and triple the number of classrooms visited in the next year.

### **REFERENCES**

1. American Association of Engineering Societies (AAES). 1998. American Perspectives on Engineers and Engineering: A Harris Poll Pilot Study Conducted for AAES. Washington, D.C.: AAES.
2. Rinehart, J. and Watson, K. (1998). A campus climate survey at Texas A&M University. Women in Engineering Conference: Creating a Global Engineering Community through Partnerships, June 1998, pp. 93-99.

