Outreach Report
May 5, 2006

Team Members:
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Overview

The Accessible Medication Dispensing Device Team accompanied by Ms. Betsy Appel traveled to LaFollette High School in Madison, WI to perform their outreach requirement. We visited Instructor Charlie Chapin's tenth grade "Math-Physics" class and presented for two 50 minute class periods during the afternoon of April 7, 2006. Our presentation was geared around the concerns that high school teenagers may have about choosing a profession. Team members aimed the presentation towards concerns that they may have had while being sophomore in high school. These concerns included a lack of knowledge of the different engineering professions and exactly what an engineer is. Also, Instructor Chapin made a special request that we concentrate on discussing the increasing role of women in engineering. We finished the presentation by discussing our experiences in the UW-Madison BME design course sequence.

Approximately 40 minutes was dedicated to an interactive presentation and the remaining time was dedicated to an open forum style question and answer session followed by a demonstration of our most recent prototype, the Daily Dose. The students were very receptive to our presentation and the candy that was given for participation to the questions we asked. The demonstration and question portion of the outreach activity was also very well accepted and the students seemed to enjoy critiquing our prototype.

A future improvement to the presentation may have been to split the presentation into two parts and have the demonstration and question session in the middle. A break in the presentation would have allowed for more interaction throughout the presentation and would have reduced the amount of time spent sitting and listening. In addition, if more time was provided, then a short game could have further stimulated the student's interest. If a game was the only activity completed, it would have severely reduced the learning experience.

Presentation

Our presentation opened by us introducing ourselves in terms of our names, disciplines in BME, and interests in school. We then showed the students two picture of engineers; one was a picture of a nerd and one was a picture of a muscular video game character with a welding mask. Austin then asked the students, "Which one of these is an engineer?" Students were given candy for participating throughout the presentation. If they said the nerd picture was a better representation of an engineer, we abruptly asserted that this was incorrect. This made the students laugh, which broke the ice. After hearing the student's opinion, Austin gave some basic description of what an engineer was. Austin's description of an engineer was a person who uses scientific knowledge to solve practical problems using technology. Austin also stated that an engineer is someone who practices a profession of engineering which led into the next section of our presentation.

Then next section of our presentation was a detailed description of the various disciplines of engineering. We detailed what each engineering discipline did and gave examples of possible projects that they would work on. Students were encouraged to raise their hands and ask questions if they had them. Austin started off by describing Biomedical, Electrical, and Mechanical Engineering. Andrew then took over and described Nuclear, Industrial, Civil, Chemical, and Computer Engineering. Mike then took over and explained Geological and Material Science Engineering. The students were then asked, "Why be an engineer?" Students were given candy for answering questions. The students were then given reasons for being an engineer including: you can help others, understand how things work, work with your hands, invent things, have an exciting and changing career, and of course earn lots of money. The students were then shown a slide of the average salaries for a starting engineer in each discipline as well as the overall salary for a starting engineer.

The next section of the presentation focused on women in engineering. Kristin began this section by reading off an invention and then asked the students, "Was this invented by a man or a woman?" Students were again given candy for answering the questions. The inventions that were used were the telephone, windshield wipers, bulletproof Kevlar, the microprocessor, dishwasher, home diabetes test, the light Bulb, and radioactivity. The inventions developed by woman were windshield wipers, bulletproof Kevlar, dishwasher, and the home diabetes test. The inventions developed by men were the telephone, microprocessor, and the light bulb. Radioactivity was a trick question because it was discovered by both a man and a woman. Surprisingly, some students knew this fact.

The next slide that Kristin explained showed two graphs. The first graph was a graph showing that the number of women awarded engineering degrees has been increasing since 1970. The second graph showed the numerous engineering degrees and the amount of men and women in each discipline. When Kristin referred to these graphs she said, "Although the amount of women receiving engineering degrees is increasing, engineering is still a field dominated by men." Kristin then asked the students, "What is the biggest reason that women lose interest in engineering?" Students were giving candy for answering the question. Kristin then gave the reasons why women should consider engineering. These reasons were: shortage of skilled workers is the number one barrier to business growth, society benefits from a more diverse engineering community, businesses benefit from engaging women in research/design/development, and engineering can be a rewarding lifetime career. At this point Betsy took over and described what can be gained from becoming an engineer. Her benefits were teamwork, communication, knowledge of technology, and critical thinking. After listing these she noted that, "These are skills that are necessary to everyday life, not just in the workforce!" Betsy then gave the students ideas of what they could do now, and these included investing more time in math and science classes, job shadowing, and planning for college. Next, Betsy talked about the various women engineering groups that there are on campus. The groups that she talked about were the Society of Women Engineers (SWE), Alpha Omega Epsilon, and Women in Science and Engineering Residential Program (WISE). After this both Kristin and Betsy talked about there experience in engineering. Kristin explained that stereotypes are less of a problem in college and that men in engineering are generally very accepting of women

engineers. Mike stated that male engineers would be happy to have female engineers around. Betsy agreed with this and talk about her Co-op experience with BioMet.

At this point, Austin began to speak about and describe the BME design class. Austin also described some of the benefits of the class as being able to learn the design process, use knowledge learned in engineering classes, do hands-on work, work with interesting projects, and interact with faculty and professionals. At this point we started to explain some the design projects we had done in the past. Austin first described the Zebra Fish Holding Chamber which we design in the spring of 2004. Andrew then described the Two Syringe Tandem which we created in the fall of 2004. Mike then when on to detail the design of the Old Timer which was created in the spring of 2005. Next, Andrew, Mike, and Austin described the Daily Dose which we have been living, breathing, and sleeping for the past year. The Daily Dose was explained in much more detail due to the fact it is our current project. We demonstrated the device's software and dispense mechanism. We also invited questions from the audience regarding the Daily Dose at this time. Lastly, we concluded the presentation by thanking the students and inviting them to the front of the room to ask additional questions and get some candy. The entire presentation lasted 50 minutes.

Description of Demonstration

Demonstration Materials (Contact Person):

- The Daily Dose Prototype (Mitch Tyler-Engineering Centers Building)
- Power Cables (Mitch Tyler- Engineering Centers Building)
- InFocus Multimedia Projector (Cindy Schkirkie- Engineering Centers Building)
- Laptop (Cindy Schkirkie- Engineering Centers Building)
- Peanut M&M's (Copp's Grocery Store)
- M&M's (Copp's Grocery Store)
- Fruit Snacks (Copp's Grocery Store)
- Crunch Bars (Copp's Grocery Store)
- Milky Way Bars (Copp's Grocery Store)

The interactive activities were broken into two sections. The first section was questions directed at the audience during the main presentation. Three questions were asked (by Austin, Mike, and Kristin, respectively): "What is an engineer?," "Why be an engineer?", "Determine the inventions that were created by women." The team members motivated the students to answer the questions and rewarded the students with their choice of candy. The candy was distributed by Mike and Austin.

The second interactive section included the Daily Dose demonstration and question and answer session. After Mike, Andrew, and Austin had described the prototype in the presentation, they dispensed multiple medications. Sufficient table space was required for the prototype and the classroom lab bench provided the needed space. The students were interested in seeing exactly how the prototype functioned, so we dismantled the prototype and showed them the internal mechanisms involved. Next, Mike, Andrew, and Austin showed the students the software, which had been written for the Daily Dose. After showing them the various

components, we asked for questions. We received a number of questions in regards to battery back-up systems, alarm systems, IR sensor function, and various other topics about design and engineering in general. The students were next invited to come forward to retrieve candy and interact freely with the Daily Dose. The demonstration and question and answer session lasted approximately 10 minutes.