Working with K-12 Partners to Improve Understanding of Engineering Programs

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Abstract: In the U.S., programs have been established over the past 30 years aimed at increasing the number of women and minorities who pursue engineering studies. In the initial years, many of the programs developed were summer activities of one- to two-weeks duration aimed at individual students from these targeted groups. Later, work with K-12 teachers was advocated as a means of reaching many more students on a more sustained basis. At Michigan Tech we have been working with K-12 students and teachers for several years. In fact, our Women in Engineering program is one of the oldest in the nation. Recently, we have developed new initiatives and partnerships with K-12 schools to provide all students with a sustained exposure to engineering over a longer period of time. This presentation will focus on describing two of these more recent initiatives.

In 1999, Michigan Tech received funding from the National Science Foundation to develop a program whereby a student could pursue teaching certification along with an engineering degree, all within a standard 4-year period of study. In an effort to recruit students into the program, an internship program was implemented through the Western U.P. Center for Science, Mathematics, and Environmental Education for undergraduate engineering students at Michigan Tech. Through this program, approximately 15 engineering students each semester were selected to conduct a variety of after-school enrichment programs in area schools. The after-school programs were conducted in weekly classes of 4-6 week sessions. Michigan Tech students traveled to assigned schools each week and met with 15-20 students for approximately 90 minutes. During the class, they conducted fun, hands-on experiments and discussed the science "behind" the activity. One of the activities was titled "Science Explorers" and included sessions on Structures, Electricity, Design, and Simple Machines. The students evaluated the sessions at the end of the six-week period. One hundred percent of the children ages 6-8 (grades 1-3) said they would have liked the program to last longer (more weeks); 93% reported they would like to take a similar class the next year; 96% reported that they liked science more after the course than they did before. A more detailed description of the program and the assessment results will be included in the presentation.

In another new initiative, Michigan Tech has formed a partnership with Utica High School to assist in the development of an engineering curriculum aimed at students in the 11^{th} and 12^{th} grades. Students at Utica High School who enroll in the program will spend 3-hours per day for the two-year period investigating engineering topics, solving problems, learning computer tools, and completing design projects. Engineering faculty from Michigan Tech will visit the high school periodically to interact with students and teachers and to serve as role models. Upon completion of the 2-year program with a minimum grade achieved, students will receive credit towards an engineering degree program at Michigan Tech. Funds for the development of this partnership have been provided by the state of Michigan who views this program as a potential model to be adopted by high schools across the state. Students are scheduled to begin the high school program in Fall 2006, therefore, no results are available to date. The presentation will focus on how the partnership was established, logistical concerns, and curricular plans for implementation. Results from program implementation will be reported at a future conference.