

Partnership with STEM High School as a Recruiting Tool for an Engineering Program

Wes Grebski¹, Shaobiao Cai²

¹The Pennsylvania State University
Hazleton Campus wxg3@psu.edu

²The Pennsylvania State University
Hazleton Campus quc13@psu.edu

ABSTRACT

The presentation describes the development of a mutually beneficial partnership between the Penn State Hazleton BS General Engineering program and the newly established STEM Magnet High School in a local school district. Hazleton Area School District recently acquired a modern building within a close proximity to Penn State Hazleton. Presently this building is being adapted to accommodate a STEM Magnet High School. This high school will focus on preparing students for careers in engineering, mathematics and technology. Hazleton Area School District invited faculty from the General Engineering program at Penn State Hazleton to become partners in curriculum development, as well as, establishing engineering laboratories at the high school level.

The curriculum development process is presently progressing and the newly created STEM high school will start operating in the 2012 Fall Semester. Penn State Hazleton engineering faculty is presently conducting two Act 48 Teacher In-service programs for high school teachers. During the upcoming academic year, the engineering faculty from Penn State Hazleton will be embedded guest speakers in different classes. General engineering students from Penn State Hazleton will be mentoring high school students.

Presentation will address challenges and opportunities of the collaboration of the General Engineering program and the newly established STEM Magnet High School. The challenges and opportunities will be presented from two perspectives, secondary and post-secondary levels.

1. Introduction

A study done by the United States Department of Education shows that only 10% of the high school graduates in the United States are pursuing engineering. This ratio is much higher in other industrialized countries. In Germany and Japan that ratio is 20%. A primary reason for this difference in career choice is the incomplete understanding both by students and their parents of careers in technology-related disciplines, what these careers offer and how they can be attained [Gray et al, 2000].

Additional studies done by the United States Department of Education have compared the K-12 curriculum in the United States, Germany, and Japan. It was found that more engineering-related concepts are taught in Germany and Japan than the United States. There was also a significant mismatch in the depth with which those concepts are being taught. In Germany and Japan, students receive a deeper understanding of the concepts. In the United States, there is only a superficial presentation. The same is true for the math and science curricula. A lack of understanding and appreciation of technical concepts decreases the students' interest and motivation in pursuing further study of math and science. A large proportion of students, when given the option, avoid math and science [U.S. Department of Education, National Center for Education Statistics, 2001]. These same factors that cause students to avoid technical disciplines are also responsible for recruitment and retention problems in engineering programs [Holling, 2003].

2. METHODOLOGIES

- To incorporate engineering-related concepts into the STEM Magnet High School curriculum.
- To provide a better understanding of engineering concepts and their applications so that STEM Magnet High School students can see the applications of math and science.
- To increase the awareness of teachers and guidance personnel about the opportunities in engineering and engineering technology.
- To increase awareness of engineering-related careers among STEM Magnet High School students and their parents.
- To provide in-service training for teachers and guidance personnel (which would meet Act 48 credit requirements).
- To offer a summer camp for students to demonstrate how math and science apply to solving “real world” engineering problems.
- To initiate activities involving both STEM Magnet High School and college students, sponsored by the Engineering Club or Student Section of ASME. This could be accomplished during the school year and linked into the engineering and engineering technology summer camp.

3. CONCLUSION

The development of a mutually beneficial partnership between the Penn State Hazleton BS General Engineering program and the newly established STEM Magnet High School in a local school district has been established. The curriculum development process is progressing rapidly. The methodologies of incorporating engineering concepts into the high school curriculum and other activities have been developed and will be implemented in the 2012 Fall semester. Project success will be measured by the increased number of students pursuing an engineering technology career. The success of the project can also be measured by the retention rates in the engineering and engineering technology majors. Project is also expected to reduce the need for remediation because of the increased K-12 preparation

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