SAIF Final Report

“Proposals to Support the Development of GE1030 Introduction to Engineering Projects”

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The three authors collaborated on a proposal to the National Science Foundation’s Bridging Engineering Education program entitled “Creating a Framework to Enhance the Engineering Literacy of Education Majors and the Instructional Effectiveness of Engineering Faculty”. The proposal was awarded funding by NSF for $99,987.

A summary of the project follows.

Proposal Summary

The goal of this proposal is to enhance the development of the U.S. Science and Engineering workforce by increasing the engineering literacy of pre-service teachers and to improve the teaching skills of engineering faculty. The two primary objectives of this proposal are to:

- increase understanding of science and mathematics applications by University of Wisconsin-Platteville (UWP) pre-service teachers, and
- improve pedagogy of UWP engineering faculty as a result of interaction with education students and faculty.

For this planning grant, the goal and its concomitant objectives will be met by investigating the pairing of a “Teaching Methods” course with an introductory “Engineering Projects” course. The planning will begin with administrative and literature review meetings held throughout Summer 2004. In these meetings, Engineering and Education faculty will discuss the current literature addressing the integration of engineering principles into the K-12 curriculum and the pedagogy of undergraduate engineering education. Strategies for pairing the two courses will be addressed. A pilot study will be implemented during the Fall 2004 semester in which twelve Education students will enroll in GE103, Introduction to Engineering Projects. Additionally, bi-weekly “BEE Seminars” held throughout the Fall 2004 and Spring 2005 semesters will provide opportunities for all participants to assess the progress of the pilot program. In addition to analyzing feedback received from the BEE seminars, the project will be assessed through surveys of student attitudes toward engineering, administration of a learning styles survey, analysis of participants’ reflective journals, and measurement of engineering literacy.

In terms of intellectual merit, the proposed work will investigate the concept of engineering literacy. Moreover, to the knowledge of the proposers, the integration of pre-service teachers into an introductory Engineering course has never been tried before. The assessment of the pilot program and the assessment of the course itself by Education faculty and students will be of great use to the engineering and education fields.

There are a number of impacts of this work. Foremost is the fact that we will create a partnership between Engineering and Education faculty and students. The proposed framework for linking education and engineering course work will be created while keeping in mind ease of implementation at other universities. Additionally, the feedback from Education faculty and students on the teaching of an engineering course by engineering faculty will help engineering faculty improve their teaching effectiveness. Finally, UWP graduates approximately 250 engineering students and 150 pre-service teachers annually, and thus the impact on the future of K-12 education as well as the profession of engineering will be significant.
Drs. Clough, Parker, and Wilson have worked on project activities during the Summer of 2004 with three Education faculty (Alison Bunte, Bill McBeth, and Jason Thrun). During the Fall 2004 semester, 9 pre-service teachers will enroll in GE103 Section 1 and take part with the six participating faculty in a series of workshops. A thorough assessment plan has been created for the program, including formative and summative assessment throughout the Fall 2004 semester.

This project has been very rewarding and the three SAIF proposal grantees are extremely grateful for the support of the University through the SAIF grant.