

Implementing Redesign in the BME Senior Capstone Experience

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Abstract

The Biomedical Engineering undergraduate program at UT Austin graduated the first ABET-accredited class of students in 2005. Each student is required to take a Senior Design Course where a 3-4 person student team receives an externally sponsored project. Our course is modeled after the nationally recognized program in Mechanical Engineering whereby each project has an external sponsor. Sponsors for BME design include: NASA, UT MD Anderson Cancer Center, International Biomedical, Inc., and the Central American Medical Outreach (CAMO, a non-profit). Our design sequence differs from ME in a couple of notable ways: first, the two semester sequence is coupled and must be taken sequentially and second, the externally sponsored project is introduced during the middle of the first semester as opposed to at the beginning of the second semester. Three classes have now taken the first semester of the two-semester BME Senior Design Course. The initial phase of the first semester is comprised of a smaller scope, internal project. We report here our experience with a pre-defined uniform project for all student teams (2005) versus a self-selected Redesign project (2006 & 2007). The pre-defined uniform project (mini-project) consisted of the design and implementation of an electronic stethoscope and the intent was to bridge the perceived gap between proscribed laboratory experiences and the larger scope, open-ended sponsored project. While many students performed exceptionally well with this assignment, a number of drawbacks were noted. Specifically, the timeline of prototyping did not match with the didactic portion of the class. Students perceived that there was a disparity between the design process and design theory. Finally, because the end point of the project was predefined, students found it difficult to articulate the problem statement. Subsequent semesters were required to select an existing biomedical device or product, disassemble that device, and propose and implement a design improvement based on the Redesign principles articulated by Otto and Wood.¹

References

1. Product Evolution: A Reverse Engineering and Redesign Methodology, Kevin N. Otto, Kristin L. Wood, Springer London, Volume 10, Number 4 / December, 1998.