Undergraduate Research Experience in First Year Seminar courses – A student's perspective

Tyler Moser[1], Rungun Nathan[1,2], Barbara Mizdail[1]
[1]Penn State Berks, Division of Engineering, Reading, PA
[2]Corresponding Author: rungun.nathan@psu.edu

Engineering careers have changed significantly in the new millennium. While engineers traditionally work in teams to address pressing issues, new fields and the rapid development of the internet have required engineers to apply never before seen magnitudes of information to new problems. This requires the ability to rapidly grasp complex concepts and use highly sophisticated information tools. While universities around the world have rapidly implemented first year courses to help students bridge their transition into the information systems of higher education, Penn State Berks has chosen to combine these trends into a distinct first year experience specifically for first year engineering students that teach important skills for both their collegiate and professional careers.

It was observed that first year engineering students come with enthusiasm ready to tackle difficult concepts. They come ready to do engineering. This program consists of a semester long first year course. Initially the students are given a selection of faculty research projects to choose from. From there, the students are separated into teams based on their choices. The projects cover a variety of disciplines, allowing students to choose both a project that they are interested in and that they believe they can excel at. The students spend the semester working on the assigned projects with the faculty researchers, supplemented with seminars in time management, library resources, and other exercises related to research and engineering staples.

All of the projects available attempt to relate to modern issues of importance to society. This is attractive to the environmental and social conscientious students of today. One such project sought to address the tragedy of children left in hot vehicles. During the course of the project, the scope and focus was adjusted from children to pets, specifically dogs, which also face great danger in an enclosed vehicle on a warm day. This project ultimately produced a prototype. The prototype consisted of a sensor equipped device inside of the vehicle that notifies an owner's device and sounds an alarm if the dog is deemed to be in danger.

Student reaction to the program is extremely positive, and this presentation will elaborate on student reactions, observations and benefits. Students have expressed that the program allowed them freedom to solve problems beyond that often found in first year courses. The course also focused primarily on gathering and applying knowledge as opposed to a traditional testing structure. Many students found this method vastly superior. The students realized that the course demanded considerably more work than the traditional first year experience courses taken by their nontechnical peers. However, the value of the work done, and a focus on how the skills learned were applicable to further study, became evident as the students progressed. An important by-product of this approach is retention of the students in engineering programs; also the desire for students to continue engaging in undergraduate research.