

Finding Suitable Products for First-year Student Projects

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In the Savonia University of Applied Sciences, Mechanical Engineering Department, every first-year student is introduced to CDIO by attending the Project Orientation for Engineering Studies course. The purpose of this course is to show how mathematics, physics, chemistry, economics and communication are related to engineering. This should increase student motivation and provide a goal for later studies at university.

In the Project Orientation for Engineering Studies course, small groups of students design and produce a working product. The course begins when students enter the university in the fall and it lasts nine months.

Students come from two different backgrounds. Approximately 70% of students have studied at high school and have better scientific skills. The remainder of the students have studied at vocational schools and they understand practical methods in producing machines.

In designing a product the main requirement is that it should include several components from the sciences such as mathematics, physics and chemistry. The integration of these sciences into designing products should be clearly understood by students. In the case of mechanical engineering, the project should include understanding of machine based production, such as machining, welding, assembly and materials science.

As already stated, the background of students varies considerably. Some students appear to have little experience in mechanical engineering and with others scientific skills are very poor. This creates a challenge to define an appropriate level of product complexity, such that every student has the opportunity to use their earlier experience and to learn something new. The product should be commonly known such that students can readily understand the function of the product because the course goal is to produce a real product which is simple and affordable enough to be manufactured. In other words, the goal has to be achievable but not easy.

The task itself must provide some of the motivation and it is helpful if the title is attractive. There are myriad different machines in the world. To increase student motivation the task should be fun. All students have their own interests, which makes this requirement very difficult to implement. One way to find interesting topics is to let students select the tasks themselves, but then the task or product will probably fail to meet the other demands mentioned in this paper. The lecturers own personal interests are important. If the lecturer is interested in the topic, then it is possible to inspire the students to work harder. Another factor is that lecturers have time to prepare the course materials beforehand if they can pre-select topics, as in integrating sciences into the design phase and pre-production analysis.

In summary, suitable topics for first-year mechanical engineering student projects should be simple, interesting, broadly based in the sciences and fun.