

Abstract

The need for solid engineering and for engineers that can engineer hasn't changed in the past 100 years. What has, however, become more and more evident is that today's, and more so tomorrow's engineers need to be equipped with skills that make them efficient and productive in a the complex environment of today's societal challenges.

Challenge-driven education (CDE) is aimed for students as well as for individuals who are focusing on, among other things, to their problem solving and team collaboration skills. These skills are widely perceived as crucial for solving the complex and wicked engineering challenges that the industry and societies face. In the very core of CDE is the aim of going through the learning cycles while at the same time serving the global society. CDE aims to put the best and the brightest to work on the problems most in need of solution¹. This makes the CDE model also both lucrative and challenging for the educator. The traditional curricula of universities do not support the CDE model throughout the degree structure. Challenge driven courses with early phase project courses are seen to support the students learning by confronting them with different knowledge gaps, mental models and conceptual understanding from the very beginning. In authentic projects the students cannot refer to the equations they have just learned in their mathematics or physics class. The uncertainty and ambiguity that arises in the real-life project work is an identification process between the interface of knowledge and the need for more knowledge. The ability to improve competence is strengthened by the fact that students are working in an authentic, open-ended and real-life situation where they need to observe, identify, design and solve problems.

In CDE:

- Problems are defined by the external stakeholders addressing real life problems and challenges with open ended formulation. The students need to develop a working relation to the problem owner towards co-creation and co-innovation and integrating pieces of knowledge and experience beyond what they have learned in their basic courses. Thus the students will develop skills to handle the ambiguity to co-create and co-crafting to provide solutions to the challenges.
- Problems may have a multidisciplinary character resulting the need to co-locate students to environments where expertise and experiences in other disciplines can be met. So basically the theoretical knowledge and conceptual framework is moved to the more practical engineering context with hands-on work on designs and crafting the solutions.
- The students will be exposed to peer learning in addition of team work skills and project management issues through interaction with other students with different discipline background. This is fostered by the target to large project teams requiring self-organization and discipline among students.

This paper presents the work-in-progress findings from a collaborative "train-the-trainer" –workshop in the context of IoT, held in Dar es Salaam, as part of Sci-GaiA project. The participants were asked to give feedback about CDE and how they perceive it. The paper starts with introducing the CDE and defining the context of IoT in learning. Next the analysis methods and the data is presented. Then the results are discussed together with the need for futures studies on the subject.