Project title: Challenge Based Education in/for Mathematics and Physics education: Towards the development of suitable ISBEP projects

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Abstract

Challenge-Based Education (CBE) is at the core of the education strategy of Eindhoven University of Technology, where the goal is to have CBE as the main characteristic of the on-campus education by 2030. Typically, in CBE students develop and use their knowledge in order to solve real-world problems in society, in multi-disciplinary groups and often in collaboration with external stakeholders. For departments of mathematics and physics innovations such as CBE are often not straightforward. In their strive for depth, they struggle for example with the multi-disciplinary nature of CBE. At the TU/e, CBE has now been explored in several educational experiments at the bachelor and master level. One of these experiments is the Innovation Space Bachelor End Projects (ISBEP), an interdisciplinary final project offered to all bachelor students of TU/e. However, few mathematics and physics students have taken up ISBEPs and this gives reason for concern.

In the first phase of the study, we have investigated the affordances and constraints for mathematics and physics students to participate in ISBEPs by studying university documents and interviewing stakeholders. We identified themes emerging from this data, which show that organizational issues played a role, but also factors related to educational innovations and the particular nature of mathematics and physics education. In the second phase we have collaborated with the departments of Applied Mathematics and Applied Physics with the aim to develop ISBEP challenges suitable for students from these departments. We have also investigated the potential interest of Applied Mathematics and Applied Physics students in ISBEP and the ISBEP experiences of an Applied Physics student.

The study helps to understand innovation efforts towards CBE, involving mathematics and physics students.