

Enhancing bachelor students' ownership in hands-on education: the case of mechanical engineering

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Abstract:

The focus of this project is on hands-on education in so-called OGO-projects in the bachelor program of the mechanical engineering department. In line with TU/e's "Strategy 2030", this department wishes to further develop these OGO-projects in the direction of Challenge Based Learning (CBL). This kind of learning is seen as very relevant for engineers, now and in the future. CBL is supposed to stimulate deep, engaging, meaningful and purposeful learning. In order to further develop the OGO-projects into the direction of CBL, it is important that students increase their ownership of learning process and learning outcomes. Teachers experience almost no increase in ownership among students over the years of the bachelor program. Despite the various attempts to make changes to this, for example, by carefully increasing the complexity of the projects (from less to more complex) and gradually decreasing support (fading), students in their second and third year hardly change towards more ownership when compared with first year students.

Intrinsic motivation is essential for realizing ownership. To address students' intrinsic motivation, the learning environment must at least meet the three basic needs that motivate one to initiate activities: Competence, Autonomy, and Relatedness. When these basic needs are fulfilled by the learning environment, students are assumed to feel a sense of ownership towards their learning.

To realize intrinsic motivation, this project experiments with giving students more autonomy in terms of shaping their OGO-project. We aim to get a clear picture of how students' ownership in hands-on education projects can be characterized and enhanced by giving them more autonomy. Episodes of students negotiating competence, autonomy, and relatedness are analyzed in student interactions in pilot groups as compared to control groups. Findings will provide guidelines for the further development of OGO-projects as these are turning into CBL projects.