

Problem-Based e-Learning to Increase Motivation of STEM-Students: Gamification of a Startup Enterprise

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Abstract

During the pandemic, online learning tools were hurriedly introduced, often without adequate preparation. Technological, pedagogical and social challenges were encountered. Especially first semester students had difficulty adjusting to university life without personal contact to their peers and to instructors. Positive advancements in the revolution of online learning occurred rapidly out of necessity. Students valued the opportunity to access learning material at their own pace, at a time and place of their own choosing. Instead of simply discarding these advancements, it could be beneficial to retain those aspects of online learning which students found helpful. Further development of beneficial components of online learning could be integrated into hybrid instruction. Research questions in this study include the following aspects:

- How did students feel about the use of e-learning platforms during the pandemic?
- Which components of e-learning systems did students find to be the most helpful?
- How could existing e-learning systems be expanded to include Problem-Based-Learning?
- Could an e-learning game which focuses on the problems of a startup enterprise increase student motivation?

A mixed-methods approach was implemented to elicit project requirements. Quantitative questionnaires of student experiences with e-learning are first evaluated. Open-ended text answers are evaluated using qualitative methods. Based on these results, a case study for a startup enterprise was designed to serve as the teaching problem. Each phase of a startup enterprise was designed as one level of a learning game on an e-learning platform. Results were analyzed with a test group of students from the first semester.

Keywords: case study, initiative, online learning, platform, project