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Gamification in Education: An Example from Logistics Education

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ABSTRACT

Since the beginning of human history, people have been playing games for pleasure or for monetary purposes. Also the idea of using games for educational and learning issues is not new. Gamification is a new approach which aims at engaging people through the use of game elements (e.g. competition, progress bars or rewards) instead of full-fledged games. Gamification can be considered as an alternate choice to conventional forms of learning such as traditional lectures.

Previous studies indicate that a game-based approach leads to a significantly higher knowledge level than traditional teaching methods. One major goal in the gamification of educational applications is to enhance students' intrinsic motivation and to subsequently improve their learning results. Since 2010 gamification has gained attention as a research area, due to its motivational effects, not only in the IS community, but also in education, marketing, and for businesses. In this paper we describe how a gamified transport chain simulator which aims to educate about complex logistics processes has been developed.

Games have been used for years to raise students' engagement and to demonstrate complex logistics processes. Simulations and business games are regularly included in the curricula for logistics and supply chain management students to help them to better understand those processes. In recent years numerous simulation and business games have been used in the logistics education of undergraduate and graduate students as well as in companies.

We developed a transport chain simulator supported by a gamified environment to increase students' motivation in order to enhance the learning performance. Based on a literature review and three interviews with IS experts, Lego Mindstorms has been identified as an appropriate hardware for the simulator. During the development period of one year, a panel of experts met every two month to discuss the current development, problems and further ideas of the gamified simulator. In fact, the panel consisted of at least one expert from the field of logistics, education and IS. In addition, two experts from the logistics industry have been involved to receive practical input during the development process. Following the results of the expert panels, the simulator has been further adapted and technologically advanced. Five pilots with 191 logistics students, teachers and representatives from the industry have provided high-quality feedback. Based on those feedback loops we improved the tasks and the game elements of the transport chain simulator.

Since people in the logistics industry frequently lack knowledge on eco-friendly transport modes an increase in education is needed to support (future) decision-makers in understanding green supply chains (European Commission, 2013). The transport chain simulator generates knowledge about transport processes and focusses on the application of the eco-friendlier transport modes railway and inland waterway. The simulator demonstrates transhipment processes of containers between an inland vessel, railway and a truck using a crane or a reach stacker. The learning aim is to understand the complexity of transport processes, the importance and problems of information sharing and the use of eco-friendly transport modes (i.e. railway and inland waterway). An increase of the share of eco-friendly transport modes (i.e. railway and inland waterway) is an important goal of European policy to reduce greenhouse gas emissions and to create a sustainable future.

This paper is part of a series of research projects dealing with gamification and its effects on attitude, behavioural intention and learning performance. As a next step, the effects of the gamified transport chain simulator on intrinsic motivation will be tested in a longitudinal study.