Gamification and Data - Learning Progress Visualization

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Abstract

A concept for a Learning Progress Visualization Tool is described. This tool is an add-on to the existing content-independent learning game platform for education, called Tourney. The extended platform is then able to provide real-time feedback for students' learning progress. It collects user data as well as game data in order to identify patterns in learning and knowledge transfer. The goal is to better understand and to reasonably improve learning and teaching in online learning environments.

Keywords: Game-based learning, gamification, data analytics, visualization, dashboard

1. Introduction

In today's digital era the use of e-learning is continuously on the rise. Businesses, but also schools and universities need to adapt to this development. In order to motivate people during their learning experience with online learning tools, a current trend called gamification is gaining awareness and is already widely applied in the business as well as the educational sector. Gamification describes the use of game elements in a non-game environment with the goal of increasing motivation. Another and very important benefit of gamified online learning tools is the immediate feedback on the users' performance.

2. Gamification and Data

In order to develop the ability to analyze student learning in the digitalized context, it is important to build data sets from online learning environments. They provide the basis to adjust instruction and knowledge transfer to individual learners' needs. Online learning tools and learning analytics have the potential to meet these needs through immediate feedback and personalization; thereby they increase motivation and performance.

Gamification elements, visualizations and data analytics tools are key components to the successful implementation of learning analytics. The conceptualized Learning Progress Visualization Tool (LPVT) will be an interface to an available online learning platform called Tourney [1][2] in order to provide students with immediate and continuous feedback on their learning progress with the help of a state-of-the-art learning dashboard. Another part of the LPVT is a database solution for the continuous collection of data on student learning in order to identify patterns that will help to improve teaching and knowledge transfer.

The main features of the LPVT are a consolidated activity overview, immediate feedback on and monitoring of performance and learning progress, evaluation of the learning progress as well as identification of knowledge gaps. An attractive and well-wrought design and state-of-the-art visualization techniques will contribute to the effectiveness of the tool. Fig. 1 illustrates the concept of the LPVT.

When the user plays a level in Tourney, the game input and output creates data traffic. A customized filter is implemented to extract the crucial information about the user's performance. The collected information is saved in a database and then summarized in a dashboard to provide a user-friendly and visualized overview of the learning progress. Simultaneously, the collected data is anonymously saved in an attached data storage system for future research and analysis.
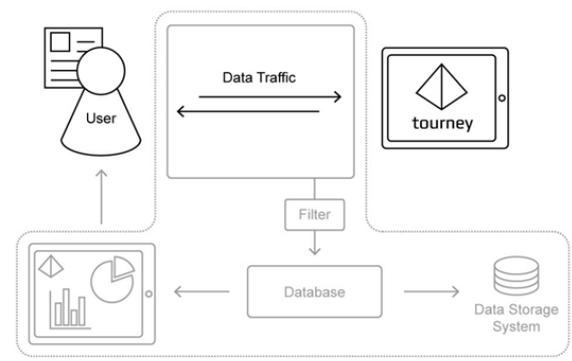

Figure 1: Concept of the Learning Progress Visualization Tool (LPVT)

3. Conclusions and Outlook

Through the combination of gamification with data analytics and visualization techniques new insights on learning progress and knowledge transfer can be achieved. Therefore, the concept of LPTV is proposed.

In forthcoming research, the project will deliver insights on the development and implementation of learning analytics tools; a discipline with increasing importance and critical potential for the necessary digital transformation of the educational sector.

4. References

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