DEVELOPMENT OF THE STRATEGIC GAMES SIMULATIONS PLATFORM

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OBJECTIVE

Active learning is considered a necessary condition for acquiring deep knowledge and skills, especially when it comes to studying business decision theory in an interactive and highly competitive environment. Moreover, the correlation between learning through simulation games and student achievement has been confirmed by a number of research studies (Vlachopoulos & Makri, 2017; Fox et al., 2018). This paper deals with the development of a platform for simulating strategic interactions, focusing primarily on models of strategic games that are studied within game theory courses. The platform is currently in its alpha phase and is being developed with three main goals: motivating students to participate more actively in the course, helping students to better understand the material, and creating a framework for studying strategic interaction of individuals. First two goals rely on the basis of game-based learning and its positive effects on learning discussed by (Thatcher, 1990; Kačavenda-Radić et al., 2011). Third goal will be a subject of future work. Main functionality of the platform is the possibility of real-time simulation of strategic games between players, both those played in pairs and in groups, upgrading the current solution which could only simulate the game between the player and the computer. This is especially interesting in multistage games, where the player can see the outcome of the previous iteration and thereby choose his/hers next actions. The platform is to be used as a tool in teaching, where the simulations would be given before, during and after the lectures, to both prepare the discussion, but also to evaluate the impact of the lessons on the students' achievements.

METHODOLOGY

Nine strategic games and the concept of a game solution (Nash Equilibrium), as well as quizzes and surveys were implemented as part of the platform (Kuzmanović, 2017). Project methodology used in development was Agile Software Development, with the process of specifying, designing, developing, and testing one functionality at a time, and thereby continuously upgrading the platform (Highsmith & Cockburn, 2001). Frameworks for code development were .NET Core 3.1 (Microsoft, 2021) for the back-end and React v17.0.2 (Facebook, 2021) for the front-end, with Rest API application programming interface. Database and web service were stored on Azure (Microsoft, 2021), and Netlify (Netlify, 2022) was used for the client service. Other tools that were used were SendGrid (Twilio, 2021) for mail services and Sentry (Functional Software, Inc. 2022) for automatic error logging.

CONCLUSION

After implementing the most important functionalities the platform was released for validation. Tested on 10 participants with different professional and academic experience and without prior knowledge of game theory, the platform gave successful results. Most of the participants cited that it was fun for them to compete with other players, think strategically about their actions to get the best payoff in the end, and asked to be included in the next phase of testing. Some of the participants engaged in the discussion afterwards about their actions and wanted to find out what would be the best strategies and expected outcomes, or Nash equilibria.

Future research will focus on using the platform within the course "Introduction to Game Theory" and measuring its impact on student engagement and performance as well as generated interest in a deeper study of the theory of strategic interactions. Students' behavior data, collected through simulations, quizzes and surveys, can be further used to define players' profile in terms of the level of their strategic reasoning, as

well as to develop a framework for predicting one's strategic abilities.

***Keywords**: game theory, simulation, game-based learning, strategic reasoning*

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