Impact of Gamification Concepts in Geography Teaching

Filipe Rodrigues Silva Ferreira
Colégio Casa Mãe

There is a growing body of literature that draws on learning principles, theories and models to explain why computerized game-based learning is effective. Yet, there is limited research with practical guidance for how games should be incorporated into the learning process to maximize their benefits. In this context, educators applying game-based theories in their practice face many challenges, one of which is making the learning experience enjoyable (thus increasing motivation) but, at the same time, reconcile this with the need to achieve goals related to learning objectives, course contents and student's achievement. The present learning experience was designed to be able to deliver content about a particular subject area, provide opportunities for simulations where students could test theories and tinker with variables and increase student's motivation and interest. The more challenging and beneficial aspects to gamification such as challenge, sense of control, decision making, and a sense of mastery (Kapp, 2012) were considered. The present study aims to analyze the application of gamification concepts in Geography classes - use of gaming simulator "Sim City 4" and assignment of digital badges – to promote student's achievement and develop 21st century skills. This quasi-experimental study (no control group or random distribution) involved students from the eleventh grade (n = 15), who participated in a cooperative assignment in Geography during 9 classes (45 minutes each) , with a pre- and post-test for knowledge assessment (questions structured according to the SOLO taxonomy), as well as a student's questionnaire about their learning perceptions, at the end of the project. The project aims to encourage students to think critically about current urban problems, presenting possible solutions through urban planning, environmental management and socioeconomic development. The student teams used the game mechanics of "Sim City 4" to answer to a set of problems based on real cases (by working with available materials and a limited budget in the game simulation, students gained a systemic understanding of urban problems and different ways of solving them). Throughout the project a system of individual and team badges was also used. The badge system allowed for some systemic considerations such as badge per task, badge families and structure, meta badges and learning paths (Berge & Muilenburg, 2016). By analyzing the students results, it is possible to conclude that the assignment had a significant impact on the students' results (effect size - Cohen's *d* - 0.667), mainly in the relational and abstract extended levels (according to the SOLO taxonomy). The analysis of the questionnaire also shows a positive impact on the students' reflection and metacognition, as well as a high satisfaction level about the methodology used in classroom, which could lead to student´s greater interest and motivation.

Keywords: Gamification; Badges; Pedagogy; Geography.