

Game-Based Learning: Advantages and Limitations

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Abstract

The paper discusses Game-based learning (GBL), also known as gamification or game science. Videogames became a mainstream media form and can be used for instructional purposes in many disciplines. The paper gives a brief overview of GBL structure, tools, guidelines for implementations, GBL usefulness and pitfalls.

Keywords: GBL, gamification, games, constructivism, hypermedia, personalization, feedback, motivation, cognitive skills.

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Introduction

The noticeable decrease in student motivation towards both learning and E-learning presents new challenges to education. There is a growing demand to make E-learning more attractive, adaptive to different types of learning, methods, and technology. The games can be an ideal medium that can bring attractivity and interactivity to the learning process. Based on the literature review, the majority of researchers agreed on the positive impact of educational video games for the learning process. The games can significantly enhance students' academic performance and increase their engagement. Moreover, video-gamers outperform non-video-gamers in visual attention, cognitive controls, and visual short-term memory (Dobrowolski, Hanusz, Sobczyk, Skorko & Wiatrow, 2015). New generation learners, grown in computer games, might need more skills to function in work environment. Researchers point at visual literacy as the most critical competency to be acquired, and thus, emphasize the necessity to shift from graphics as static visualization to animation, dynamic visualization (Olsson, Mozelius & Collin, 2015, p. 442).

Game-Based Learning: Structure and Definitions

N. Pelling introduced the term “gamification” in 2002, but only during the last decade, the concept became popularized (Kim, 2015). Gamification, or game-based learning, also known as game science, is the process utilizing motivational affordances through digital games to advance learning behavior in a significant way (Hamari, Koivisto & Sarsa, 2014; Ismail & Tyler-Jones, 2018; de Freitas, 2018).

Many scholars view game-based learning as a promising constructivist learning paradigm (as cited in Papastergiou, 2008, p.20). It is based on prior knowledge, meaningful learning, sense of

autonomy, exploratory, collaborative, and authentic tasks, and “support various modes of interaction and collaboration, such as student-instructor and student-student, and should cater for respective tools” (Papastergiou, p.25-26). This approach, on the one hand, allows students to be in control over their learning and become active learners, and on the other hand, push the instructors to revise their teaching styles and opt for innovative methods.

Gamification is used to train/educate the learners in different areas such as education, learning, health science, business, library, workplace, law, defense, programming. It consists of game mechanics and game dynamics. Game mechanics include “principles, rules and/or mechanisms that direct the desired behavior through a system of incentives, feedback, and rewards with reasonably predictable outcomes,” and game dynamics establishes “when and how” incentives should be presented (Tu, Yen, Sujo-Montes & Roberts, 2015, p.155-56). Motivation is a starting point of gamification, where the accents are placed on developing interest and curiosity. Applied correctly, the game mechanics (to increase the motivation) and dynamics (to increase engagement) ideally lead to a “shift from an extrinsic motivation...towards an autotelic motivation” (Kaufmann, 2018, p.127). In other words, current publications incline towards the concept of *meaningful* gamification. It means moving away from the games used to support extrinsic motivation (assigning points, levels, badges, achievements, etc. as a reward) to the games oriented on intrinsic motivation and focused on the elements of play (completing the task the best one can because he/she wants to do so) (Ling, 2018, p.142; Tu et al., p. 171).

Positive impact of gamification on learning

Recent studies in game science indicate some gamification features that positively impact learning process: a) short feedback cycles: students can learn much faster when a reinforcing process (feedback) follows the activity right away (Ismail & Tyler-Jones, 2018); b) challenge,

fantasy, rules/goals, curiosity, control, sensory stimuli, feedback, engaging storyline, social interaction, diversion, completion, arousal, immersion, concentration, skill, autonomy, cooperation, recognition, transformation of time, knowledge improvement, engagement preference, involvement usability, cognitive load, instructions used in the games, type of learning environment (Ak & Kutlu, 2017, p. 131); c) interdisciplinary perspective: importance to play in learning (education studies), greater brain volume and plasticity, transferability skills - eye coordination and visual activity (neuroscience), data modeling and personalization (information science) (de Freitas, p.79).

Tools for creating educational video games

The most challenging tasks since last decade remain the same: how to integrate the games to LMS platforms and create an application of Learning Model Object, a feature that enables to package the content to be easily retrieved by various systems. Implementation of massively multiplayer online role-playing games (MMORPG) such as EverquestTM and World of WarcraftTM had a positive effect on developing a vocabulary (communicating with native speakers), collaborative and social skills (Karagiorgas, 2017, p.500). Other games, Kerbal Space Program, Crusader Kings, Civilization, are suitable for tangential learning (Mozelius, Fagerström & Söderquist, 2017).

Guidelines on how to integrate educational games

I found two interesting GBL applications. One was using mobile game application for collaborating activity in MOOC course. (Ramírez-Donoso, Rojas-Riethmuller, Pérez-Sanagustín & Neyem, 2017). In another experiment, a game was used as a scaffolding tool for the Women in Film module (Ling, 2018). In both cases, the findings showed student's appreciation of the supportive environment and their high participation.

The games by themselves are not sufficient. Based on literature review, I formulated several guidelines for successful game implementation to complement learning process:

1. Games have to match the course objectives, subject matter, and assessment (Ismail & Tyler-Jones, 2018, p.250; Tu et al., p. 168);
2. Games “should be exploited with regularity and for a suitable period, so that students are allowed to get acquainted with and to explore, experiment, and develop strategies within the game environment” (Papastergiou, p.36);
3. Tangential learning: the game should be used “to inspire learners to further self-studies... to engage and stimulate learning by putting abstract knowledge in an attractive and engaging context” (Mozelius et al., p. 345).
4. Games should consider learners’ gaming personalities, preferences or characteristics (Tu et al., p. 168). According to The Bartle Test of Gamer Psychology, the gamers are classified into socializer, achiever, explorer, and killer (as cited in Tu et al.).
5. Meaningful gaming is based on a unity of the cognitive (competency), social (autonomy), and emotional (relatedness) components (as cited in Ling, p. 143).
6. Instructors should feel comfortable when applying alternative pedagogies (Moore-Russo, Wiss & Grabowski, 2018, p. 3-4).
7. Instructors should focus on problematizing issues that students identify in video games (Love, 2017, p.8).

GBL's pitfalls

Games creation and integration are time-consuming. Often the education institutions cannot afford high-tech implementation (what the games are), such as 3D graphics. Also, since game designers create the games, the pedagogy behind them and its modification are not accessible to the instructors. One more pitfall, for instance, is “when students are focused on passing high stakes examinations, participation in a gamified environment can be viewed as an unnecessary hindrance” (Moore-Russo et al., p. 3-4). There are some apparent negative features - games might lead to isolation and antisocial behavior. A common view of the games is “waste of time” and “mindless toy.” Also, the negative image of video games is promoted by the media portraying them as violent and biased. All of these above features, based on reviewed literature, lead to existing illiteracy regarding gamification and inhibit its further implementation.

Conclusion

Unfortunately, I did not find a convincing argument to become a pro-GBL. I do not entirely share that learning has to be transformed into a “fun” activity. There is nothing wrong with reading the books: some disciplines still require to work on primary sources. I have not identified games applied to humanities or those that lead to developing critical thinking. A term “textualism,” widely used to describe those who believe that “true” knowledge comes through textual definitions, probably partially portrays me. However, as a future instructional designer, I would not entirely reject the games. I will take them very seriously: I will conduct needs analysis, surveys, interview the instructor, evaluate the discipline and the module before implementing gamification.

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