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On the effectiveness of game-like and social approaches in learning: Comparing educational gaming, gamification & social networking



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ABSTRACT

Game-like approaches are becoming increasingly popular in education, with educational games and gamification drawing increasing levels of attention. While games specifically designed for educational purposes have been used for decades, gamification is particularly new and contrasting evidence was presented about its effectiveness. The potential of social networks has also been harnessed by educators and institutions either using popular social networking sites or specific educational instances. This paper studies how well-established approaches (educational game and social networking) compare with more novel ones (gamification and social gamification) in terms of learning performance in an undergraduate course. Four experimental conditions were compared in an experiment ($N = 379$). Results suggest that all experimental conditions significantly impact on learning performance, but social gamification returned better results in terms of immediacy and for all types of assessments.

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1. Introduction

A game is a system that presents a set of meaningful motivating challenges to the player. Game designers can carefully align game mechanics and dynamics with a compelling narrative and a feedback system to create a sense of seamless progression that captures player's attention and can keep her deeply immersed in the experience. Furthermore, game communities provide a venue where players can communicate, share and build knowledge around the game. According to several scholars (Gee, 2007; Squire, 2011) good videogames and their emergent cultures provide problem-solving spaces where learning occurs, because challenge and learning are at the heart of motivation and entertainment.

The potential of videogames as educational tools has created a growing interest and expectations in the gameful world drawing the attention of educators and institutions that want to harness the potential of videogames to create more engaging and meaningful learning experiences that facilitate long-term learning. Such interest has been realized in different directions. On one side of the spectrum, educational games are complete systems designed with the purpose of training their players. Serious game mechanics assist in the translation of learning goals and practices into the mechanical element of gameplay mapping design patterns and pedagogical practices (Arnab et al., 2015; Lim et al., 2014). On the other side, gamification takes

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game elements and uses them in non-game contexts to motivate action (Deterding, Dixon, Khaled, & Nacke, 2011; Werbach & Hunter, 2012). One of the contexts in which gamification has drawn more attention is education (Kapp, 2012), to the point of turning gamification into a buzzword situated at the peak of inflated expectations of the hype cycle in 2013.¹ Early research on the area outlined design and architectural models to incorporate game-like approaches in educational settings (Haksu & Young Yim, 2012; Raymer, 2011; Simões, Redondo, & Vilas, 2013). First experimental studies reported mostly positive outcomes in terms of learning and other educational outcomes (Bellotti et al., 2013; Denny, 2013; Fitz-Walter, Tjondronegoro, & Wyeth, 2012; Li, Grossman, & Fitzmaurice, 2012; Santos et al., 2013; Sheldon, 2012), but also pointed to some preliminary contradictions like the questionable quality of students' feedback (Halan, Rossen, Cendan, & Lok, 2010) or the convenience of certain game elements to convey different kinds of learning (Dominguez et al., 2013). However, recent studies questioning the lack of empirical evidence as well as the effectiveness of educational games and gamification in learning and instruction as well as in broader contexts (Connolly, Boyle, MacArthur, Hainey, & Boyle, 2012; Dicheva, Dichev, Agre, & Angelova, 2015; Hanus & Fox, 2015; Mekler, Brühlmann, Opwis, & Tuch, 2013), suggest that we are now on our way down "trough of disillusionment" of the hype cycle.²

Social networks and social media are pervasive today. They offer almost unlimited possibilities for online sharing and collaboration. User interactions are also stored and can be effectively used and mined to crowdsource contents and contributions, offering endless opportunities for personalization. Such possibilities have also drawn the attention of the education and research communities. There is an important and also growing body of literature about the uses and effects of different social media in education. Popular social networks expedite student–student and student–teacher interaction, communication and collaboration improving student's attitude (Despotovic-Zrakic, Labus, & Milic, 2011). Educational networking impacts on students' motivation, retention, engagement, satisfaction, individual creativity and personal interaction, increasing the efficiency of communication and facilitating differing viewpoints (Brady, Holcomb, & Smith, 2010). The individual position that each student has on the network is also important, influencing social learning (Paredes & Chung, 2012), learning performance (Cho, Gay, Davidson, & Ingraffea, 2007) and even creativity (Gaggioli, Mazzoni, Milani, & Riva, 2015). Still, critical accounts question the claims about the purposeful integration of social media as an educational tool because most empirical evidence about the utility and effectiveness of social media is based on self-reported data and content analysis (Tess, 2013).

Social gamification aims to bring together gamification and social networking to combine the potential of both approaches to create compelling socially-driven user experiences. From an educational perspective, it can harness the motivational aspects of gamification to stimulate participation and engagement with learning contents and with other participants. Social networks facilitate communication, explicit social ties and highlight relevant content elements for participants. Their potential can also be harnessed to cooperate and create meaningful conversations in learning interactions. The combination of both can create a kind of multiplication effect in which gamification can be used to promote social desirable learning behaviors, and actions in the social network can be used to design gamification props that produce motivational boosts in educational settings. To our best knowledge, the only study that deals with social gamification in education is Simoes et al. (Simões et al., 2013) which presents a framework for integrating and evaluating gamified elements in primary education. The potential benefits of integration of both approaches have therefore only been cursorily studied.

Beyond the hype, critical voices call for serious empirical account of the motivational and learning potential of educational games (Connolly et al., 2012), gamification (Dicheva et al., 2015) and social networking (Tess, 2013). Within this context, this paper aims to study and compare the educational effectiveness (in terms of learning performance) of four instruments: educational games, gamification, social networking and social gamification. Educational games can harness many of the affordances of games to facilitate meaningful learning experiences. Gamification can be used to foster competition between participants. Social networking promotes collaboration by providing tools for communication, sharing knowledge and by opening spaces for contribution. As gamification and social networking can only be appealing for certain types of learners, we think that the combination of both can successfully address the motivational needs of a wider audience of learners. Educational games have been employed in a wide variety of contexts ranging from commercial off-the-shelf games that can be used in the classroom to games specifically designed to meet learning goals. In terms of educational games, this study focuses on the first type as specific games are difficult to find for each specific educational settings while off-the-shelf and sometimes free games are already available. Although this also requires time to search and assess their suitability for particular learning situations. Education is the area where gamification has been more extensively reported in research (Hamari, Koivisto, & Sarsa, 2014). Therefore there is a wide spectrum of approaches, ranging from game-inspired instructional design that aims to foster engagement and achievement (Fabricatore & López, 2014), to reward-based strategies that focus on extrinsic motivation promoting competition (Dominguez et al., 2013). Our focus is on reward-based gamification as it is more common and easier to implement (Werbach & Hunter, 2012) although we are also aware that extrinsic rewards can ultimately undermine motivation. The uses and results of educational social networking are widely reported also, ranging from models of training and performance that integrate social media as a central part of learning experience (Paredes & Chung, 2012), to a supportive role of social networking in the wider context of the learning experience (de-Jorge-Moreno, 2012). Our focus in this case is driven by the communicative and cooperative affordances that social networks offer and by their capability to highlight relevant contributions and key participants. This also contrasts with our approach to gamification and offers, in our

¹ Gartner's 2013 Hype Cycle for Emerging Technologies: <http://www.gartner.com/newsroom/id/2575515>.

² Gartner's 2014 Hype Cycle for Emerging Technologies: <http://www.gartner.com/newsroom/id/2819918>.

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