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An empirical study comparing gamification and social networking on e-learning

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ABSTRACT

While social networking has already demonstrated its efficiency in e-learning, gamification, which is the use of game-thinking and playful design in non-game contexts, has only shown its potential as a motivational tool. This paper presents the results of testing both social networking and gamification in an undergraduate course, comparing them in terms their effect on students' academic achievement, participation and attitude. The effects of a gamification plugin deployed in a learning management system were compared to those of a social networking site in the same educational setting. We found that both approaches presented better performance than a traditional e-learning approach in terms of academic achievement for practical assignments, but that, when it came to assessing knowledge, the traditional e-learning approach was better. Also challenging current assumptions, participation rates and scores remained low with the new tools, although students' attitudes were positive.

1. Introduction

Gamification is the use of game elements and game-design techniques in non-game contexts to engage people and solve problems (Deterding, Dixon, Khaled, & Nacke, 2011; Werbach & Hunter, 2012; Zichermann & Cunningham, 2011). Games present clear objectives, which are further divided into short-term achievable goals that give a seamless sense of progression to players by providing frequent rewards that act as external motivators. Advances in information and communication technology have enriched games by endowing them with instant feedback and instant connection with other players. Videogames are part of a multidisciplinary, growing and leading industry attracting talented designers, artists and programmers alike (Chatfield, 2010). Harnessing the ability of videogames to promote creative thinking and productivity could lead to new ways of tackling real world problems. Videogame advocates suggest that videogames can have a real impact on everyday activities and that they have the potential to make a better world (McGonigal, 2011). Besides, game-based learning has already shown the potential of videogames to broaden audiences and integrate disadvantaged target groups, thus making education more accessible (Kam et al., 2008; Schmitz, Czauderna, Klemke, & Specht, 2011).

Gamification is currently driven by the success and momentum of videogames but it also draws on different psychological theories, mostly using motivational models. Self-determination theory (Ryan & Deci, 2000) identifies two types of motivation, extrinsic and intrinsic, and depicts a sort of continuum from one to the other. Gameful design should strive for intrinsic motivation, which is the kind of motivation in which the activity is rewarding in and of itself. Offering rewards is a kind of extrinsic motivation and this can be used to engage participants, but only as a tool towards promoting authentic intrinsic motivation in which the activity itself becomes the reward.

Use of gamification may have great potential in traditional education where we often find students demotivated and lecturers failing to engage them in learning activities. This is also true in e-learning where mediated communication, lack of eye contact and lack of direct

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exposure of students to a teacher's expertise can aggravate the problem (Dreyfus & Dreyfus, 1986; Flores-Morador, 2013). In current work on the application of gamification to teaching and learning, Haksu and Young Yim (2012) describe how to design learning activities using a gameful design approach, Raymer (2011) provides suggestions on how to engage and promote participation through e-learning systems, Erenli (2012) reflects on the impact and soundness of gamification in teaching from a teacher's perspective and Simões, Redondo, and Vilas (2013) present a framework aimed to help teachers integrate game elements in learning activities which are validated in real scenarios. Gamification in education is "a serious approach to accelerating the experience curve of learning, teaching complex subjects, and systems thinking" (Kapp, 2012: p. 13), but there is little, if any, solid empirical evidence of gamification's effectiveness in education. Empirical studies seem to question such effectiveness, especially in e-learning settings, pointing to the potential problems that students and instructional designers face (Domínguez et al., 2013). Other studies of gamification in education have found that it is effective in terms of engaging students in non-curricular activities (Fitz-Walter, Tjondronegoro, & Wyeth, 2012) and promoting behavior changes in order to increase participation in peer tutoring sessions, something which is ultimately reflected as an increase in the passing percentage (Decker & Lawley, 2013).

In contrast, social networking has a well-established body of theoretical and empirical knowledge regarding its effectiveness in e-learning settings. Existing studies have showed the influence of students' online social networking in their social learning and academic learning (Tian, Yu, Vogel, & Kwok, 2011) and have also found correlations between usage levels and perceived levels of learning (Thoms, 2011). Furthermore, it has been found that social network properties (e.g. centrality) significantly influence learners' performance (Cho, Gay, Davidson, & Ingraffea, 2007; De-Jorge-Moreno, 2012).

This paper compares both approaches, gamification and social networking, empirically in an introductory course on information technology. We designed and tested two different instruments that were intended to deliver mechanisms for motivation and participation. The first tool was a gamification plugin built into the learning management system. It offered rewarding opportunities for engaging in course activities along with room for competition between students. The second tool was a networking site that provided a solid ground for collaboration, interaction and discussion with other participants around the course materials. Our aim was to compare both approaches in the same study site to determine their effectiveness in terms of achievements of students, levels of participation and engagement and students' attitudes towards each tool. The rest of the paper is structured as follows: Section 2 presents the experimental design, describing the experimental setting, instruments and methodology; Section 3 presents the results of students' achievement, participation and perception and Section 4 presents conclusions, discussion, limitations and further research lines.

2. Experimental design

2.1. Study site

Qualification for Information and Communication Technologies (ICT) is an undergraduate course that covers the basics of information and communication technologies and provides students with basic competency with the computer and office applications. The course lasts for 15 weeks and it has a workload of 6–10 hours per week. It includes the following modules: (1) ICT, the computer and its components, (2) operating systems, (3) word processing, (4) spreadsheets, (5) presentations, (6) databases and (7) networks and communication. The syllabus is based on the European Computer Driving License (ECDL) and the International Computer Driving License (ICDL) programmes.[1] ECDL/ICDL are intended to become de facto standard certifications of digital literacy and competency.

The course uses a blended learning approach where students have three hours of lecture every week. Lectures are complemented with previous readings and activities, which are delivered online through the BlackBoard learning management system. Each module includes two or three activities that introduce students to the main concepts in a practical way and therefore represent the core of the learning experience. Activities are introduced in the lectures, but students have to complete them outside the lab. Students have textual descriptions of the activities as well as sample solutions. Evaluation items for the course include four assignments to assess the skills and competencies of modules 3, 4, 5 and 6, and a final examination to assess knowledge covering all contents but focusing on modules 1, 2 and 7. Students are also credited for participation in class as well as on the e-learning platform and can get up to 5% for completing online activities and tests, contributing to forums, etc. Experience from previous classes had shown low completion rates for activities, which were subsequently reflected as poor performance records. Providing students with tools to motivate participation may therefore be a sound approach to improve involvement and performance.

2.2. Research questions

Our year-long experiment looked to explore the following research questions:

1. Will gamification and/or social networking impact learning in large classroom environments?
2. Will gamification and/or social networking impact participation rates?
3. Will students have a positive attitude towards these tools?

2.3. Instruments

In order to compare the performance as well as the attitude of students towards gamification and towards social networking, we devised two systems that allowed students to interact with the course materials and with other students. The first instrument was a gamification plugin deployed in the BlackBoard system, which allowed students to complete course activities and compete and collaborate with other students. Each activity was presented as a challenge and divided into levels (three or four per activity depending on the activity's

[1] ECDL Foundation. ECDL/ICDL programmes: http://www.ecdl.org/programmes/ecdl_icdl.