



Gamification of Tertiary Courses: An Exploratory Study of Learning and Engagement

Varina Paisley

Department of Marketing and Management
Macquarie University and CAPA International Education, Sydney, Australia

Abstract:

'Gamification' is the implementation of game elements into non-game settings. In education, the purpose of gamification is to increase student engagement and motivation through the introduction of game elements such as leaderboards, badges and levels. Currently there is limited research into gamification in education and much of the research has focused on young children and 'play' or the implementation of gaming into classes, often technology based classes. This study explores the effectiveness of gamification in tertiary management education which may have implications for a wide range of tertiary education fields and identifies areas for further research.

Keywords: Gamification, management, student engagement, learning principles, motivation, education.

Introduction

Gamification involves incorporating game elements and game mechanics to non-game settings (Deterding, Sicart, Nacke, O'Hara, & Dixon, 2011). One of the main aims of gamification is to increase engagement and motivation (see Domínguez et al., 2013; Simões, Redondo, & Vilas, 2013). Gamification is used in a range of settings including businesses which use game elements to engage consumers in their advertising (Terlutter & Capella, 2013) and loyalty programs (Huotari & Hamari, 2012). These elements may include scoreboards or experience points (xp) to track progress towards goals, badges to reward achievements, and leaderboards to compare progress with peers. Gamification also become an important element in the design of many software applications (Zichermann & Cunningham, 2011) including eLearning platforms (see Hilton, 2013; Muntean, 2011; Simões et al., 2013).

To experiment with principles of gamification, a trial was conducted with US American study abroad students at a Sydney study centre. During a course on cross-cultural communication students were encouraged to undertake optional experiential learning activities that were not assessed. The game element of a leaderboard was used to encourage students to undertake these extracurricular activities outside of class which were aligned with learning outcomes for the course. The extracurricular nature of the activities and voluntary participation reinforced their learning as "at-home digital game-play provides many opportunities for autonomous learning through explorations that promote cycles of theory-building, testing, and reflection, in ever increasing levels of complexity" (Nolan & McBride, 2011, p. 5). A leaderboard was useful for creating a social component and motivating through "bragging rights and social capital to the individuals who achieved the high scores." (Kapp, 2012, p. 34) Students self-reported their achievements and earned experience points commensurate with the degree of complexity of the experiential task.

Literature Review

Gamification and game-based learning

As gamification is an emerging field, there is limited literature on it. However, there is ample literature on using games in learning. Using game mechanics in non-gaming scenarios has been shown to “motivate individuals to attain personal goals, solve communal problems, and direct systemic activity” (DuBravac, 2012, p. 68).

For education, gamification offers the potential for greater student engagement and motivation (Simões et al., 2013) in classroom and online settings. Gamification allows instructors to “situate learners in authentic environments in which they can practice their skills and gain immediate feedback on progress and accomplishments, earn recognition for doing well, and feel good for overcoming a challenge.” (Kapp, 2012, p. 22). Using games in learning however is not new (Muntean, 2011) and gamification elements may not need to be totally derived from video games but also playground games or board games (Glover, 2013). What is relatively new is a wave of scholarly and university administrator interest that has raised the profile of gamification (Simões et al., 2013). This interest may lead to new resources and technological improvements allowing further experimentation and implementation of ‘gamified’ courses.

Intrinsic motivation and goal theory

Intrinsic motivation can increase the enjoyment, performance and persistence of students’ learning (Cordova & Lepper, 1996; Mills & Blankstein, 2000). This study explores whether the implementation of gamification increases student engagement and motivation in the tertiary environment and the results can be related to a range of motivational theories. The use of a leaderboard and its influence on students’ motivation may be explained by goal setting theory (Ma, Jain, & Oikonomou, 2011, p. 409). Given that students have the choice over which activities to perform and when, gamification may also link to both performance and mastery orientation (Ames & Archer, 1988; Pintrich, 2003). This could be an area that could be explored by further research.

Research Methods

This exploratory research was conducted with 21 US American Management students in a Cross-Cultural Communication class. Students were given a list of experiential activities which could earn them xp and a leaderboard was formed. The experiment was designed to see if the xp and leaderboard elements of gamification would motivate students to go beyond the required activities and how the implementation of gamification influenced student engagement and learning. Participation in the gamification element of class as well as completing the surveys was voluntary and the surveys were anonymous.

Students were surveyed after four weeks of classes (three and a half hour classes held once per week) prior to the implementation of gamification. They were then surveyed again after a further four weeks with the gamification elements of xp and a leaderboard in place. The quantitative survey was developed utilizing a Likert scale to measure student engagement. This is consistent with other research in the area of engagement and learning (Kuh, 2003; Leithwood & Jantzi, 1999; Ma et al., 2011; Meece, Blumenfeld, & Hoyle, 1988; Shernoff, Csikszentmihalyi, Shneider, & Shernoff, 2003).

This research was based on ‘low tech’ mechanisms of gaining xp and a leaderboard function. This was deliberate because “most education and training does not require this level of fidelity as skills training is not the most typical instructional outcome. Instead, the most common course objective is transference of knowledge.” (Ma et al., 2011, p. 399). Statistical analysis was then performed in order to compare the two surveys which were paired by students.

Table 1: Sample activities and assigned 'xp'

Activity	xp
Learnt "thank you" in another language	1000
Talked about a cultural experience in class	1000
Watched a documentary about another culture	1500
Added an International 'leader' to your social network	1500
Participated in Harmony Month	1500
Write a blog about your Australian experiences	2000
Write at least 3 journal or diary entries reflecting on your Australian experience	2000
Taken a tour of the Auburn Mosque	2000
Volunteer to do a 4 minute presentation on another culture in class	2000

Results

Preliminary results demonstrated that students were actively participating in the experiential and non-assessable activities in order to gain xp points and a position on the leaderboard. The leaderboard ranged from 2300 xps to 60,000 xps which demonstrated that every student in the class was motivated to participate.

A paired t-test analysis was conducted to test for differences between the sample before gamification and after the implementation of gamification. This analysis demonstrated that there was a significant increase in students' perceived engagement ($p= 0.025$) as well as an increase in their perceived motivation after the implementation of gamification ($p= 0.009$), as indicated in Figure 1. Interestingly, one variable that significantly increased was examining strengths and weaknesses ($p=0.009$).

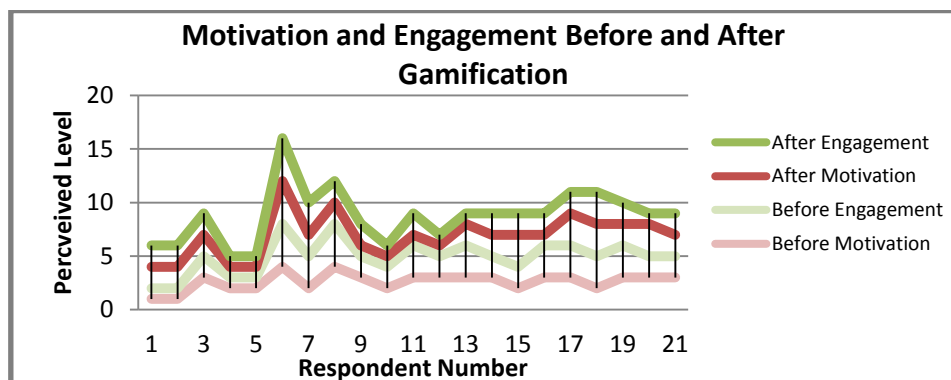


Figure 1: Student Engagement and Motivation: Before and After Gamification

Discussion

This study demonstrates that gamification elements of xp and a leaderboard can be utilized successfully to increase perceived student engagement and motivate students to actively participate in activities that were not formally a part of their assessment. The research conducted may have broader implications for the implementation of gamification in education and perhaps even in management.

There were limitations of this research including the very specific sample used, the relatively small sample size and the self-reporting method used. As the participants were study abroad students, and activities were experiential in nature, this may have influenced levels of participation in the gamification of class. Application of gamification in alternative learning environments and subjects is an area for further research.

The cultural background of the students was largely US American or at very least, students were attending University in US America. The cultural implications of gamification is another area for further research as, according to GLOBE cultural factors, US Americans have high levels of individualism and performance orientation (Javidan & Dastmalchian, 2009). This may influence the degree of competitiveness of the students and, as a result, their level of motivation by the competition stimulated by the leaderboard. Whether gamification would be as effective in other learning contexts and students' cultural backgrounds is an important area for future research.

Another area for further research would be the implications for students at the bottom of the leaderboard. Due to the highly visible nature of the leaderboard, it was important in this study that activities that students could do in order to earn xp were not assessment related. The outcome of the gamification for homework, for example, may yield different results (Goehle, 2013). There may also be further implications for students at the bottom of the leaderboard and whether this serves as a de-motivating factor could be investigated.

Lastly, given the 'low tech' nature of this research, an area that could be further explored is whether high technology scenarios increase student engagement or whether relatively 'low tech' options could be better implemented using the range of technology available.

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Acknowledgments

The author acknowledges a Research Grant from CAPA International Education. The author also acknowledges the two reviewers of this paper and thanks the generous advice from Mark Tayar at Macquarie University and Dr Dan Caprar at University of New South Wales.

Author contact details Varina Paisley is a Lecturer at CAPA International Education, Sydney and conducts research as the Managing Director of Knowledge Academy in the areas of cultural identity, international business and learning. She can be contacted at varinapaisley@gmail.com.

Please cite as: Paisley, V. (2013). Gamification of Tertiary Courses: An Exploratory Study of Learning and Engagement. In H. Carter, M. Gosper and J. Hedberg (Eds.), *Electric Dreams. Proceedings ascilite 2013 Sydney*. (pp.671-675)

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