

Drivers and Barriers to Adopting Gamification: Teachers' Perspectives

Antonio Sánchez-Mena¹ and José Martí-Parreño*²

¹HR Manager- Universidad Europea de Valencia, Valencia, Spain and Universidad Europea de Canarias, Tenerife, Spain

²Associate Professor - Universidad Europea de Valencia, Valencia, Spain

antonio.sanchezmena@universidadeuropea.es

jose.marti@universidadeuropea.es

Abstract: Gamification is the use of game design elements in non-game contexts and it is gaining momentum in a wide range of areas including education. Despite increasing academic research exploring the use of gamification in education little is known about teachers' main drivers and barriers to using gamification in their courses. Using a phenomenology approach, 16 online structured interviews were conducted in order to explore the main drivers that encourage teachers serving in Higher Education institutions to using gamification in their courses. The main barriers that prevent teachers from using gamification were also analysed. Four main drivers (attention-motivation, entertainment, interactivity, and easiness to learn) and four main barriers (lack of resources, students' apathy, subject fit, and classroom dynamics) were identified. Results suggest that teachers perceive the use of gamification both as beneficial but also as a potential risk for classroom atmosphere. Managerial recommendations for managers of Higher Education institutions, limitations of the study, and future research lines are also addressed.

Keywords: gamification, games and learning, drivers, barriers, teachers, Higher Education.

1. Introduction

Technological developments and teaching methodologies associated with them represent new opportunities in education but also a challenge for teachers of Higher Education institutions. Teachers must face questions regarding whether to implement new teaching methodologies in their courses based on their beliefs on expected outcomes, performance, costs, and benefits. For example, associated costs when implementing a new teaching technology in a course vary from personal costs (e.g. time devoted to preparing new teaching materials) to institutional costs (e.g. new equipment like digital blackboards or computers). Not less important are the uncertainty of the expected learning outcomes or students' satisfaction with the new teaching methodology. For example, previous research found that students show different attitudes towards active learning methodologies that demand a more proactive learning role on the student side (Liu and Littlewood, 1997). Moreover, previous research also found that students can show a resistant attitude towards active learning methodologies such as group-based projects (Livingstone and Lynch, 2000). Gamification represents such a challenge for teachers serving in Higher Education institutions as it is becoming a trending topic in education. Although gamification is not limited to the use of technology-driven games for educational purposes (for example, educational video games in the shape of serious games), educational video games account for a high percentage of all gamification efforts in education (for a review see: Boyle et al, 2016). These technology-driven educational games can challenge teachers' attitude in terms of media literacy but also the uncertain outcomes when using gamification in their courses. On the one hand, it has been stated that the use of video games for educational purposes might motivate the new generations of students that have grown up in the age of video games (Glover, 2013). Educational video games can also motivate digital natives (Prensky, 2001) who make an intense use of technology and digital interactivity and for whom traditional learning methodologies do not appeal or motivate them anymore. Consequently, they have become disengaged with school and this disengagement has affected their learning outcomes (Simões, Díaz Redondo, and Fernández Vilas, 2013). It has also been stated that the fun and excitement provided by video games can highly motivate players (Ferguson and Olson, 2013) providing a huge potential for educational application (Cheng, She, and Annetta, 2015). On the other hand, the literature review offers mixed results regarding the effectiveness of gamification in education (Girard, Ecalle, and Magnan, 2013). It has been criticised that game-based learning often concerns repetition of cyclic content that provokes persistent re-engagement which tends to address lower-level learning goals rather than higher-level goals (Ma et al, 2007). This process can also elicit adverse effects in social interaction in team-based conditions (Brom et al, 2014).

In light of these mixed results, teachers can be challenged on the decision of whether to implement or not gamification in their courses. Academic literature acknowledges that teachers are the primary agents in introducing new teaching methodologies in their courses (Teo, 2008). Nevertheless, it has been pointed out that research on game-based learning has been largely ignoring the important role teachers play (Jong and Shang, 2015). Thus, the main goal of this study is to gain a better knowledge of factors acting as drivers or barriers for teachers to using gamification in their courses. A better understanding of teachers' experiences and beliefs about the use of gamification can help both teachers interested in successfully implementing gamification in their courses and Higher Education managers interested in introducing gamification in their institutions.

Therefore, this study's main goal is twofold: a) to explore the main drivers that encourage Higher Education teachers from using gamification in their courses, b) to explore the main barriers that prevent Higher Education teachers from using gamification in their courses. To achieve this goal, 16 online structured interviews were conducted and analysed using a phenomenology approach consisting of a constant comparative analysis via text mining.

This piece of research contributes to current academic literature in gamification providing useful insights on the main drivers that can fuel teachers' use of gamification. It also provides information about the main barriers that can prevent teachers from using gamification. By identifying these drivers and barriers, the results of this research will contribute to Higher Education institutions policies regarding the adoption of gamification. Higher Education managers will find in this study useful insights to support teachers interested in using gamification in their courses.

This paper is structured as follows: firstly, we review literature on gamification to posit the research questions. Secondly, we present the method used and the results. Lastly, we address discussion, conclusions, managerial implications, limitations of the study, and future research lines.

2. The gamification of education

Although a game-based approach to education can be traced back to the sixties (Piaget, 1962) and the pioneer work of Abt (1970), Malone and Lepper (1987), and Loftus and Loftus (1983), the potential of using video games in education has been highlighted more recently (Prensky, 2001; Gee, 2003). Gamification has been defined as "the use of game design elements in non-game contexts" (Deterding et al., 2011, p. 9). Therefore, gamification focuses on game design and game mechanics. Deterding et al.'s (2011) approach contrasts gamification "against other related concepts such as serious games via the two dimensions of playing/gaming and parts/whole" (p. 5). One important conceptual implication of this approach is that there is no need for a "game" in gamification. Rather than using a game in the classroom, the teacher *makes the class itself a game* (Hanus and Fox 2015). Consistent with Deterding et al.'s (2011) definition of gamification, the gamification of education has been defined as "the use of game elements in a learning environment" (Simões, Díaz Redondo, and Fernández Vilas, 2013, p. 3).

The rationale behind applying game design elements to non-game contexts like education is that key psychological states elicited by games (e.g. immersion, flow, involvement) can help to increase individuals' motivation, engagement, and performance in non-gaming activities. In education, it has been stated that through gamification 'students could be motivated to learn in new ways or enjoy otherwise tedious tasks' (Hanus and Fox, 2015, p. 152). It is assumed that the elements that make games fun along with the nature of games themselves are intrinsically motivating (Adams et al. 2012) so applying game elements and mechanics to the classroom may increase students' intrinsic motivation to learn (Hanus and Fox, 2015).

Previous research found that using games or games elements in learning favours a trial-and-error process which makes mistakes recoverable (Hanus and Fox, 2015); gives students the freedom to fail without fear when learning (Lee and Hamer, 2011); provides immediate and frequent feedback (Kapp, 2012); tailors difficulty progression that facilitates scaffolded instruction based on each individual student's needs (Hanus and Fox, 2015); offers a visual display of progress (e.g. using badges) (Kapp, 2012); and encourages motivation through competition (e.g. through leaderboards) (Camilleri, Busuttil, and Montebello, 2011). Previous research also found that lack of expertise in applying new methodologies or lack of resources are common barriers for teachers when applying technological innovations in the classroom (Mumtaz, 2000). Moreover, teachers can

face new technological developments in education as a threat and technological innovations can be a cause of much anxiety (Goodwyn, Adams, and Clarke, 1997). As gamification can be considered a technological innovation this study is focused on the main drivers and barriers teachers experience when using gamification.

3. Research questions

Literature review clearly suggests that teachers face different barriers when implementing game-based learning in their courses. For example, Demirbilek and Tamerb (2010) identified six main barriers in Lower Secondary and Upper Secondary School teachers to adopt game-based learning including classroom management problems and technical infrastructure (e.g. computers not working or power cuts). Teachers also expressed anxiety of not being able to complete all the curriculum topics if they use game-based learning. Bourgonjon et al. (2013) found that teachers were reluctant to use educational video games because they were not really convinced that educational video games are very useful for enhancing their job performance. This finding suggests that perceived value is an important driver to implementing pedagogical innovations. Hamari and Nousiainen's (2015) findings suggest that educational video game adoption is affected by teachers' perceived compatibility of Information and Communication Technologies (ICT) with teaching, teachers' perceived self-efficacy with ICT, teachers' perceived supportive ICT organizational culture, teachers' openness towards ICT, and teachers' perceived value of educational video games. Therefore, teachers' adoption of educational video games as a teaching methodology relies heavily not only on individual factors but also on social environment (e.g. supportive ICT organizational culture in the education institution) (Hamari and Nousiainen, 2015). This finding supports previous research that identified the key role teachers play in introducing pedagogical innovations in the classroom, especially technology-related innovations (Ketelhut and Schifter, 2011; Mumtaz, 2000). Ince and Demirbilek (2013) investigated Secondary and High School teachers' perceptions about adopting educational video games in their courses finding two potential barriers: a) teachers viewed themselves as technically unprepared for computer usage skills needed to manage educational video games, and b) teachers expressed the necessity of increasing the amount of educational video games aligned with the curriculum.

As teachers are key agents in the teaching-learning process (Biesta, Priestley, and Robinson, 2015), and teachers play a key role in introducing pedagogical innovations in the classroom, especially technology-related innovations (Ketelhut and Schifter, 2011; Mumtaz, 2000), teachers' beliefs of gamification will play a key role in implementing or not gamification in their courses. Therefore, this study focuses on the key drivers that encourage teachers to using gamification in their courses and the main barriers that prevent teachers from doing it. Therefore, we address as primary research questions teachers' beliefs about the main drivers and barriers they experience when using gamification in their courses:

RQ1: which are the main drivers that teachers serving in Higher Education institutions find when using gamification in their courses?

RQ2: which are the main barriers that teachers serving in Higher Education institutions find when using gamification in their courses?

4. Method

A phenomenology approach was used in this research. Phenomenology aims to understand the meaning that daily events and experiences have for individuals (Maykut and Morehouse, 1994) and allow researchers to understand how individuals build up their own reality of the world. This reality is subjective, based on each individual meanings and interpretation of the world through experiences, and expressed through natural language. Data was gathered through online structured interviews on a sample of teachers serving in Higher Education institutions. Snowball sampling (Goodman, 1961; Biernacki and Waldorf, 1981) was used for selecting respondents in this study. Although snowball sampling is unlikely to obtain a representative sample because there is no real control of the snowball effect, this form of sampling is often used when it is impossible to identify beforehand all those who might fall into the project's category of interest (Hall and Hall 1996).

The researchers forwarded an email to colleagues and acquaintances serving in Higher Education institutions asking for collaboration in this research. Respondents who have used gamification at least once in their classes were asked to answer an online structured interview (see Appendix 1) via a link provided in the email. Respondents were also asked to forward the email to colleagues and acquaintances serving in Higher

Education institutions. The researchers used constant comparative analysis along with identified keywords via text mining to cluster the main themes. Intercoder reliability was 100% as all disagreements were discussed by the researchers until an agreement was reached.

4.1 Sample

A final sample of 16 online structured interviews of teachers serving in Higher Education institutions was analysed. Only interviews from teachers that reported having used gamification in their courses were analysed. Respondents' age range is from 26 to 65, the average age of participants is 43.75 years old, and 56.25% are female. Of the sample, most of the respondents teach in the Degrees of Marketing (37.5%) and Business (25%). The average years of experience in using gamification is 2.25 years. Table 1 shows sample information.

Table 1: Sample information

GAMIFICATION EXPERIENCE	MAIN SUBJECT BEING TAUGHT	DEGREE	AGE	GENDER
5 years	Principles of Marketing	Business	55	Female
5 years	Marketing Research	Business	37	Male
1 year	International Law	Law	46	Male
1 year	Marketing Research	Marketing	60	Male
1 year	Introduction to Advertising	Advertising	31	Female
1 year	Marketing Communications	Marketing	35	Female
4 years	Psychology of Education	Education	41	Male
3 years	Clinical Psychology	Psychology	36	Female
4 years	Marketing Research	Marketing	26	Female
1 year	Consumer Behaviour	Marketing	34	Male
3 years	International Marketing	Marketing	56	Male
2 years	Research Methods	Odontology	48	Female
2 years	Marketing Research	Business	65	Male
1 year	Destination Marketing	Tourism	37	Female
1 year	Principles of Marketing	Marketing	51	Female
1 year	Econometrics	Business	42	Female

5. Results

Data was analysed using text mining software Wordstats 7.0.11. RQ1 addressed teachers' main drivers to use gamification in their courses. A word frequency analysis revealed that the most commonly used terms when teachers were asked about the main drivers they find when using gamification in their courses was students (number of cases=8) and motivation (n=8), followed by creativity (n=5), and entertainment (n=3). Top eleven keywords are shown in Table 2.

Table 2: Results of the words frequency analysis for drivers

	% PROCESSED	% TOTAL	NO. CASES	TF • IDF*
STUDENTS	4,19%	1,63%	8	6,2
MOTIVATION	4,19%	1,63%	8	6,2
CREATIVITY	2,62%	1,02%	5	4,9
ENTERTAINMENT	1,57%	0,61%	3	3,6
EASY	1,57%	0,61%	2	4,1
ATTENTION	1,05%	0,41%	2	2,7
DEVELOPMENT	1,05%	0,41%	2	2,7
DYNAMISM	1,05%	0,41%	2	2,7
EMPATHY	1,05%	0,41%	2	2,7
INNOVATION	1,05%	0,41%	2	2,7
INTERACTIVITY	1,05%	0,41%	2	2,7

* Term frequency weighted by inverse document frequency

Top keywords were clustered in four themes which emerged as the main drivers for teachers' use of gamification in their courses: i) attention-motivation, ii) entertainment, iii) interactivity, and iv) easiness to learn. The attention-motivation theme is expressed by a respondent as follows:

'Gamification increases student motivation because of the entertainment provided by the game' (F1/48)
 Innovation is related to this theme as teachers perceive that the novelty of using innovative methodologies (such as educational video games) in the classroom can increase students' attention and motivation.

Entertainment is considered as intrinsic to games by teachers and they link the entertainment capacity of video games as a main driver to motivate students and draw attention to the learning activities. Interactivity is also an important theme linked to other constructs such as empathy and dynamism:

'Using gamification in the classroom is more dynamic and interactive than traditional teaching methodologies' (F2/55)

Finally, easiness is also a driver for some respondents to use gamification in their courses. Nevertheless, this easiness is not related to how easy it is for teachers to use gamification in their courses but how gamification facilitates students' learning (easiness to learn):

'It is easier for students to learn using this methodology' (F3/42)

RQ2 addressed teachers' main barriers when using gamification in their courses. A new word frequency analysis was run to answer this question. Results revealed that the most commonly used term when teachers were asked about the main barriers they find when using gamification in their courses was time (number of cases=9), followed by resources (n=5), methodology (n=4), students (n=4), and activities (n=4). Top eleven keywords are shown in Table 3.

Table 3: Results of the words frequency analysis for barriers

	% PROCESSED	% TOTAL	NO. CASES	TF • IDF*
TIME	1,88%	1,12%	9	6,5
RESOURCES	1,25%	0,74%	5	5,8
METHODOLOGY	0,83%	0,50%	4	4,3
STUDENTS	0,83%	0,50%	4	4,3
ACTIVITIES	0,83%	0,50%	3	4,8
TECHNICS	0,63%	0,37%	3	3,6
CLASSES	0,63%	0,37%	3	3,6
SUBJECT	0,63%	0,37%	3	3,6
MATERIALS	0,63%	0,37%	3	3,6
CONTENTS	0,42%	0,25%	2	2,7
COSTS	0,42%	0,25%	2	2,7

* Term frequency weighted by inverse document frequency.

Top keywords were clustered in four main themes which emerged as the main barriers for teachers' use of gamification in their courses: i) lack of resources (time, training, classroom setting, and economic support), ii) students apathy (lack of interest), iii) subjects, and iv) classroom dynamics. Perceived lack of resources is expressed by a respondent as follows:

'Much more time is needed in the process of designing and planning the (gamified) teaching activities. Moreover, you need many more resources to deliver these activities' (M1/41)

Several respondents reported physical classroom setting as a barrier for gamified classes:

'Case room type settings or classrooms with fixed seating are not conducive for simulations I use' (M2/60)

The second identified theme –students' apathy– is related to teachers' beliefs about students' lack of interest in gamified courses as a consequence of students' lack of perceived usefulness of gamified courses:

'I just used gamification once in my courses because students felt they were wasting their time' (F4/51)

This “perceived waste of time” was the most used concept to describe students’ lack of interest in gamified courses:

‘So many times the students are not used to gamified classes and they behave reluctantly to gamification because they feel they are wasting their time or they misunderstand the objectives addressed in the session when using gamification’ (M3/34)

Another important theme is related to the subject being taught. Teachers referred to the subject they are teaching as an important barrier to using gamification:

‘I lack the knowledge to adapt gamification to the subject I teach’ (F5/35)

‘Gamification can be useful for some subjects but not for all. For me it is difficult to use gamification in subjects in which I must teach complex maths-related elements’ (M4/37)

Along with the specific characteristics of the subject being taught and teachers’ lack of knowledge to achieve the learning goals through gamification, another subject-related issue was teachers’ beliefs that gamification can prevent them from complying with the teaching schedule:

‘Tight learning schedule that does not allow for enough gamification’ (M5/46)

‘That there is often not the time for it, as bachelor students have a full calendar and we have a lot of material to go through together’ (F6/31)

Finally, classroom dynamics was also considered a main barrier for some respondents:

‘When I use gamification in my courses my colleagues teaching in classrooms nearby criticise the laughter and noise coming from my classroom’ (M6/56)

One respondent broadened the effects of classroom dynamics to managers:

‘Managers do not like gamification because they think students should be seated and quiet while listening to the lecture’ (F7/36)

Table 4 summarises the main identified drivers and barriers.

Table 4: Main identified drivers and barriers

DRIVERS		BARRIERS	
THEME	ITEMS	THEME	ITEMS
<i>Attention-motivation</i>	<ul style="list-style-type: none"> Increases student attention to learning materials Increases student motivation 	<i>Lack of resources</i>	<ul style="list-style-type: none"> Lack of time Lack of training Inappropriate classroom setting Lack of economic support
<i>Entertainment Interactivity</i>	<ul style="list-style-type: none"> Learning while having fun Active learning Empathy 	<i>Students’ apathy Subjects</i>	<ul style="list-style-type: none"> Perceived waste of time Does not fit subject Does not fit subject schedule
<i>Easiness to learn</i>	<ul style="list-style-type: none"> Easier than traditional learning 	<i>Classroom dynamics</i>	<ul style="list-style-type: none"> Disturbs classroom/university atmosphere Potential conflict with other teachers

6. Discussion

Our findings suggest four main drivers that encourage teachers to use gamification in their courses. The first one, attention-motivation, assumes that gamification is able to draw students’ attention to the learning materials and increase students’ motivation to learn. This finding is consistent with previous research that found that educational games draw attention and increased motivation of learners (Su and Cheng, 2015) and is linked to the intrinsic entertaining nature of games. Attention and motivation are key factors in the learning

process (Keller, 1987) so a main driver for teachers seems to be achieving higher student attentional and motivational levels through gamification because of the entertaining nature of games, which is, “learning while having fun”. Teachers also assume that the interactivity needed when playing a game is an important driver to increase students’ involvement with their learning process. This finding is consistent with previous research suggesting that playing games supports active learning (Oblinger, 2004). This finding is also consistent with more recent studies that found teachers believe that educational video games can contribute to students’ learning through interactive learning via trial-and-error processes (Demirbilek and Tamer, 2010). Teachers also assume that gamification can facilitate students’ learning (easiness to learn) as they feel it is easier for students to learn through gamification than through traditional methodologies (e.g. lectures) probably because the extra motivation and attention elicited by games. This is consistent with High School teachers’ perceptions found in Ince and Demirbilek (2013) in which perceived effortlessness and student motivation provided by computer games ranked the highest in teachers’ positive perceptions to use a gamification approach in their courses. Regarding the main barriers preventing teachers from using gamification in their courses, results suggest that the lack of resources is a major barrier. Teachers’ perceptions of lack of resources involves: i) lack of time to prepare gamified classes, ii) lack of materials for gamified courses, and iii) lack of specific training to teach using gamification. Lack of economic support was also mentioned by teachers as a barrier, suggesting that maybe teachers assume that gamification involves the use of expensive hardware (e.g. computers or tablets) and software (e.g. custom-made video games). Our findings are consistent with previous research which found lack of time, training, and economic support as key factors preventing teachers’ use of information and communications technologies in the classroom (for a review see: Mumtaz, 2000). More recently, Demirbilek and Tamer (2010) also found that teachers believed they lack appropriate education on how to use educational video games. This can be applied to a broader gamification context (not only the use of educational video games) with teachers lacking appropriate training in how to use online gamification solutions such as Kahoot! One surprising result is that teachers’ perception of students’ lack of interest in gamified courses also prevent them from using gamification in their courses as they feel their effort in preparing gamified classes is not worth it because students do not value it properly. Previous research already pointed out that teachers were concerned about students’ lack of interest in using computer games with educational features based on a perceived inappropriateness within the course content (Can and Cagiltay, 2006). Another major concern for teachers is the feeling that gamification just does not fit their subjects suggesting that maybe some subjects are more suitable than others for gamification. This is consistent with Ince and Demirbilek’s (2013) findings among High School teachers. Emin-Martinez and Ney (2013) also found teachers look for consistency of the game-based learning activities they use with the curriculum they teach. The ‘need to fit the schedule of the subject’ suggests that some teachers consider gamification as a kind of extra activity that can be of interest because its novelty but it is not central to the learning process of the subject. Broadly speaking, gamification seems to be considered as a cool innovation but ‘borrows time’ for the real task of learning the subject. This seems a wrong approach to gamification which does not consider gamification among other classroom methodologies designed to learn the subject but just as some kind of innovative or surprising activity per se. One surprising barrier identified in this research is classroom dynamics as some teachers feel that the excitement and playful atmosphere driven by gamified classes can disturb colleagues teaching in classrooms nearby. Previous research found a positive effect of gamification in classroom atmosphere from a student perspective (Yang, 2012), but our findings suggest that the impact of gamification in classroom atmosphere, as perceived by teachers, can be a much more complex factor that might be analysed using a multidimensional approach.

7. Conclusions, limitations, and future research

The main goal of this research was to explore teachers’ main drivers and barriers when using gamification in their courses. Four main drivers and four main barriers were found suggesting that teachers can perceive gamification both as a benefit but also as a potential harm. More specifically, four main drivers were identified as contributing to teachers’ intentions of using gamification in their courses: i) teachers’ beliefs about the capacity of gamification to draw students’ attention, ii) teachers’ beliefs that the entertaining nature of gamification can motivate students to learn, iii) teachers’ beliefs that gamification can contribute to a more interactive learning, and iv) teachers’ beliefs that gamification can facilitate students’ learning. This research also identified four main barriers that can prevent teachers from using gamification in their courses: i) lack of resources (including time to prepare gamified activities and classroom setting), ii) students’ lack of interest in gamification, iii) teachers’ beliefs about the suitability of gamification for the subjects they teach, and iv) classroom dynamics (exciting and playful atmosphere) that eventually might harm college atmosphere.

On the one hand, teachers perceive that gamification can increase students' attention and motivation for learning. This seems of special relevance to teaching younger generations of students who are no longer interested in traditional pedagogical approaches to learning. Therefore, teachers perceive that by using gamification they can better attract students' attention and enhance their motivation to learn. Moreover, this motivation comes from the entertaining nature of gamification itself providing students with an intrinsic motivation to learn (learning is fun). The interactive nature of gaming can also benefit students' trial-and-error learning processes and might increase students' involvement during the learning process. This learning approach is aligned with a constructivist approach to learning which places students at the centre of the learning process and fosters learning by doing in an increasing trend of a competencies-based education. Finally, teachers also believe that gamification facilitates students' learning better than other teaching methodologies. On the other hand, teachers perceive that gamification challenges them in several ways. One main barrier for teachers to use gamification in their courses is the perceived lack of resources including time to prepare gamified activities, lack of knowledge on gamification, and inappropriate classroom setting for gamified activities. Teachers seem to need organizational support (including Teacher Training Programmes) to overcome these limitations. Another main barrier is teachers' beliefs that students do not always value the effort they put into introducing gamified activities in their courses. Teachers' perceptions of students' lack of interest in gamified activities deserves further research, but it might be related to students' beliefs that they are "not learning, just playing". Therefore, teachers should carefully design gamified activities so students can perceive the learning value in the activity and respond to the activity in the way teachers expect, that is, highly motivated towards the gamified activity. Subject fit seems another barrier for teachers as some teachers perceive gamification is not suitable for all subjects. Nevertheless, academic literature suggests that a gamification approach to education can be used in a wide range of subjects including Newtonian physics (Shute, Ventura and Kim, 2013), health education (Sung, Hwang and Yen, 2015), veterinary education (De Bie and Lipman, 2012), energy education (Yang, Chien & Liu 2012), language teaching (Reinders and Wattana, 2014), citizenship education (Lim and Ong, 2012), and nanotechnology (Blonder and Sakhnini, 2012) to name a few. Our findings suggest that teachers might not be totally aware of the potential of gamification in education believing that gamification can be applied only to a limited number of subjects. Therefore, Teacher Training Programmes can be used to broaden teachers' perspective and applications of gamification. Finally, although enhancing classroom dynamics is a positive outcome of gamified classes, our findings also suggest that some teachers seem to feel that excessive excitement and fun provided by gamified activities can affect negatively overall atmosphere in the university. Moreover, gamified activities might damage teachers' relationships with other colleagues who disapprove the use of gamification in the classroom when uncontrolled noise arises during gamified activities. Teachers seem to believe that if they are not carefully controlling gamified activities these events could become a potential source of conflict with colleagues.

From a managerial point of view, managers in Higher Education institutions should pay attention to all barriers identified in this research if they are interested in implementing gamified courses at their institutions. Previous research found that it is important for teachers to feel supported by their institution's leadership (Kington et al., 2012). In this case, leadership support could come in the shape of more resources to use gamification in the classroom including special Teacher Training Programmes focused on the use of gamification in education. Otherwise, teachers might perceive that managers promote traditional teaching methods, that is "students seated and quiet while listening to the lecture", over more active methodologies that can alter classroom atmosphere. Managers can also provide resources in the shape of classroom settings suitable for gamification activities.

One main limitation of this exploratory study is the convenience sample used. Because snowball sampling does not allow controlling the sample at a demographic level, the average age of participants is high therefore providing a biased perception of teachers' drivers and barriers when using gamification in Higher Education institutions. Future research should control this variable to overcome this limitation using a wider age range that better represents the target population. Another sample limitation is that most of the respondents teach in Marketing and Business Degrees (62.5%) with other Degrees being underrepresented in the sample. Future research should control this variable to overcome the bias in this study.

Other variables besides those identified in this exploratory study can affect teachers' use of gamification in their courses. Previous research found that personal factors such as teachers' perceived compatibility of Information and Communication Technologies (ICT) with teaching, teachers' attitude towards ICT, and teachers' openness towards ICT affects teachers' adoption of educational video games (Hamari and

Nousiainen, 2015). Therefore, teachers' openness towards new pedagogical approaches, teachers' innovativeness, and teachers' teaching style might affect their use of gamification. Culture affects human behaviour, so future research should consider culture as a moderating variable to replicate this study on a cross-cultural basis. This seems especially important because gamification usually involves students playing group activities. Because some cultures rank higher in individualism versus collectivism (Hofstede, 1991) more research is needed to gauge the cultural differences that affect the use of gamification as a teaching-learning methodology.

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References

- Abt, C. C., 1970. *Serious games: The art and science of games that simulate life*. New York: Viking Press.
- Adams, D. M., Mayer, R. E., MacNamara, A., Koenig, A., and Wainess, R., 2012. Narrative games for learning: Testing the discovery and narrative hypotheses. *Journal of Educational Psychology*, 104(1), pp. 235-249.
- Biesta, G., Priestley, M., and Robinson, S., 2015. The role of beliefs in teacher agency. *Teachers and Teaching*, 21(6), pp. 624-640.
- Biernacki, P., and Waldorf, D., 1981. Snowball sampling. *Sociological Methods and Research*, 10(2), pp. 141-163.
- Blonder, R. and Sakhnini, S., 2012. Teaching two basic nanotechnology concepts in secondary school by using a variety of teaching methods. *Chemistry Education Research and Practice*, 13(4), pp. 500-516.
- Bourgonjon, J., De Grove, F., De Smet, C., Van Looy, J., Soetaert, R. and Valcke, M., 2013. Acceptance of game-based learning by secondary school teachers. *Computers & Education*, 67, pp. 21-35.
- Boyle, E. A., Hainey, T., Connolly, T. M., Gray, G., Earp, J., Ott, M., and Pereira, J., 2016. An update to the systematic literature review of empirical evidence of the impacts and outcomes of computer games and serious games. *Computers & Education*, 94, pp. 178-192.
- Brom, C., Buchtová, M., Šisler, V., Děchtěrenko, F., Palme, R., and Glenk, L. M., 2014. Flow, social interaction anxiety and salivary cortisol responses in serious games: A quasi-experimental study. *Computers & Education*, 79, pp. 69-100.
- Camilleri, V., Busuttill, L., and Montebello, M., 2011. Social interactive learning in multiplayer games. In Ma, M., Oikonomou, A. and Jain, L. C. (Eds.). *Serious games and edutainment applications* (pp. 481-501). London, England: Springer-Verlag.
- Can, G., and Cagiltay, K., 2006. Turkish prospective teachers' perceptions regarding the use of computer games with educational features. *Educational Technology & Society*, 9(1), pp. 308-321.
- Cheng, M.-T., She, H.-C., and Annetta, L. A., 2015. Game immersion experience: its hierarchical structure and impact on game-based science learning. *Journal of Computer Assisted Learning*, 31(3), pp. 232-253.
- De Bie, M.H. and Lipman, L.J.A., 2012. The Use of Digital Games and Simulators in Veterinary Education: An Overview with Examples. *Journal of Veterinary Medical Education*, 39(1), pp. 13-20.
- Demirbilek, M. and Tamer, S. L., 2010. Math teachers' perspectives on using educational computer games in math education. *Procedia-Social and Behavioral Sciences*, 9, pp. 709-716.
- Deterding, S., Dixon, D., Khaled, R., and Nacke, L., 2011. From game design elements to gamefulness: defining gamification. In *Proceedings of the 15th International Academic MindTrek Conference: Envisioning Future Media Environments*, pp. 9-15.
- Emin-Martinez, V. and Ney, M., 2013. Supporting teachers in the process of adoption of game based learning pedagogy. In Paula Escudeiro and Carlos Vaz de Carvalho (Eds.). *Proceedings of the 7th European Conference on Games Based Learning* (pp. 156-162): Academic Conferences International Limited (ACPI). Porto (Portugal), October 2013.
- Ferguson and Olson, 2013. Friends, fun, frustration and fantasy: Child motivations for video game play. *Motivation and Emotion*. 37(1), pp. 154-164.
- Gee, J. P., 2003. What video games have to teach us about learning and literacy. *Computers in Entertainment (CIE)*, 1(1), pp. 20-20.
- Girard, C., Ecalte, J., and Magnan, A., 2013. Serious games as new educational tools: How effective are they? A meta-analysis of recent studies. *Journal of Computer Assisted Learning*, 29(3), pp. 207-219.
- Glover, I., 2013. Play as you learn: gamification as a technique for motivating learners. In Herrington, J. et al. (Eds.). *Proceedings of World Conference on Educational Multimedia, Hypermedia and Telecommunications*, pp. 1999-2008, Chesapeake, VA.
- Goodman, L. A., 1961. Snowball sampling. *The Annals of Mathematical Statistics*. 32(1), pp. 148-170.
- Goodwyn, A., Adams A., and Clarke, S. 1997. The Great God of the Future: the views of current and future English teachers on the place of IT in literacy. *English in Education*, 31(2), pp. 54-62.
- Hall, D. and Hall, I. M., 1996. *Practical Social Research: Project Work in the Community*. London: Macmillan.
- Hamari, J. and Nousiainen, T., 2015. Why do teachers use game-based learning technologies? The role of individual and institutional ICT readiness. In *Proceedings of the 48th Hawaii International Conference on System Sciences (HICSS)*, pp. 682-691, IEEE.

- Hanus, M. D., and Fox, J., 2015. Assessing the effects of gamification in the classroom: A longitudinal study on intrinsic motivation, social comparison, satisfaction, effort, and academic performance. *Computers & Education*, 80, pp. 152-161.
- Hofstede, G., 1991. *Cultures and Organizations*. McGraw-Hill: London.
- Ince, E. Y. and Demirebilek, M., 2013. Secondary and high school teachers' perceptions regarding computer games with educational features in Turkey. *Anthropologist*, 16(1-2), pp. 89-96.
- Jong, M. S.-Y. and Shang, J., 2015. Impeding Phenomena Emerging from Students' Constructivist Online Game-Based Learning Process: Implications for the Importance of Teacher Facilitation. *Educational Technology & Society*, 18(2), pp. 262-283.
- Kapp, K. M., 2012. *The gamification of learning and instruction: Game-based methods and strategies for training and education*. San Francisco, CA: Pfeiffer.
- Keller, J. M., 1987. Development and Use of the ARCS Model of Motivational Design. *Journal of Instructional Development*, 10(3), pp. 1-10.
- Ketelhut, D. J. and Schifter, C. C., 2011. Teachers and game-based learning: Improving understanding of how to increase efficacy of adoption. *Computers & Education*, 56(2), pp. 539-546.
- Kington, A., Regan, E., Sammons, P., and Day, C., 2012. Effective Classroom Practice: A Mixed-method Study of Influences and Outcomes: a Research Paper. *Journal of Mixed Methods Research*, 5(2), pp. 103-125.
- Lee, J. J., and Hammer, J., 2011. Gamification in education: What, How, Why Bother? *Academic Exchange Quarterly*, 15(2), pp. 146-151.
- Lim, K.Y., and Ong, M.Y., 2012. The rise of Li' Tledot: A study of citizenship education through game-based learning. *Australasian Journal of Educational Technology*, 28(8), pp. 1420-1432.
- Liu, N. F. and Littlewood, W., 1997. Why do many students appear reluctant to participate in classroom learning discourse? *System*, 25(3), pp. 371-384.
- Livingstone, D. and Lynch, K., 2000. Group project work and student-centred active learning: Two different experiences. *Studies in Higher education*, 25(3), pp. 325-345.
- Loftus, G. R., and Loftus, E. F., 1983. *Mind at play: The psychology of video games*. New York: Basic Books.
- Ma, Y., Williams, D., Prejean, L. and Richard, C., 2007. A research agenda for developing and implementing educational computer games: colloquium. *British Journal of Educational Technology*, 38(3), pp. 513-518.
- Malone, T. W., and Lepper, M. R., 1987. Making learning fun: A taxonomy of intrinsic motivations for learning. *Aptitude, learning, and instruction*, 3, pp. 223-253.
- Maykut, P. and Morehouse, R., 1994. *Beginning Qualitative Research, a Philosophic and Practical Guide*. London: Routledge Falmer
- Mumtaz, S., 2000. Factors affecting teachers' use of information and communications technology: a review of the literature, *Journal of Information Technology for Teacher Education*, 9(3), pp. 319-342.
- Oblinger, D. G., 2004. The Next Generation of Educational Engagement. *Journal of Interactive Media in Education*, 8(1), pp. 1-18.
- Piaget, J., 1962. *Play, Dreams and Imitation in Childhood*. New York: W.W. Norton & Co.
- Prensky, M., 2001. *Digital Game-Based Learning*. New York: McGraw-Hill.
- Reinders, H. and Wattana, S., 2014. Can I say something? The effects of digital game play on willingness to communicate. *Language Learning & Technology*, 18(2), pp. 101-123.
- Simões, J., Díaz Redondo, R. D., and Fernández Vilas, A. F., 2013. A social gamification framework for a K-6 learning platform. *Computers in Human Behavior*, 29(2), pp. 345-353.
- Shute, V. J., Ventura, M. and Kim, Y. J. 2013. Assessment and learning of qualitative physics in newton's playground. *The Journal of Educational Research*, 106(6), pp. 423-430.
- Su, C.-H., and Cheng, C.-H., 2015. A mobile gamification learning system for improving the learning motivation and achievements. *Journal of Computer Assisted Learning*, 31(3), pp. 268-286.
- Sung, H. Y., Hwang, G. J. and Yen, Y. F., 2015. Development of a contextual decision-making game for improving students' learning performance in a health education course. *Computers & Education*, 82, pp. 179-190.
- Teo, T., 2008. Pre-service teachers' attitudes towards computer use: a Singapore survey. *Australasian Journal of Educational Technology*, 24(4), pp. 413-424.
- Yang, Y. C., 2012. Building virtual cities, inspiring intelligent citizens: Digital games for developing students' problem solving and learning motivation. *Computers & Education*, 59(2), pp. 365-377.
- Yang, J. C., Chien, K. H. and Liu, T. C., 2012. A digital game-based learning system for energy education: An energy conservation pet. *The Turkish Online Journal of Educational Technology*, 11(2), pp. 27-37.

Appendix 1. Interview questions

1. Have you ever used gamification in your courses? (filter question)
2. How long have you been using gamification in your courses?
3. Please describe in your own words the type/s of gamification activity you mostly use in your courses
4. Please describe the main drivers that encourage you to use gamification in your courses
5. Please describe the main barriers that prevent you from using gamification in your courses