



Gaming in Action

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Published by Mesleki Giriřimciler ve Toplum Gönüllüleri Derneđi
(Tarsus / Mersin, Turkey).

Layout production by Searchlighter Services Ltd, Bristol, UK.

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Strategic Partnership acting within the Erasmus Plus Programme.

First Published in 2021

ISBN : 978-605-70651-0-0

Printed in Istanbul, Turkey at

özkaracan
1965

Öz Karacan Printers and Binders,
Güneřli, Bađcılar, İstanbul

The *Gaming in Action – engaging adult learners with games and gamification* Strategic Partnership project has been funded with support from the European Commission. The content of this publication reflects the views only of the authors and editors, and the Commission cannot be held responsible for any use which may be made of the information contained therein.

A Brief Surf on the Net for Gamification Research

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1. A look at changes in the nature of instructional methods

With the improvements in technology, for quite a while instructional approaches having been going through changes and we encounter a variety of forms in education. Some of the means that come to our minds at the outset can be counted as online or distance education programmes, face-to-face or blended courses, flipped classes, education via television broadcasts, live videos, podcasts, web-based or mobile-learning systems, among many others. Each form of education can be said to be designed taking into consideration numerous variables according to the convenience of the target population. Instructional designers put the learners in the centre of the teaching/learning context and utilise various strategies in order to attract the interest and enhance motivation of the course takers. Gamifying the learning environment is one of them.

2. Definition of gamification

Groh, 2012; Nah, Zeng, Telaporulu, Ayyappa and Eschenbrenner, 2014; Marcos, Cabot and Lopez (2017) describe gamification using more-or-less similar words as Deterding (2011) who define gamification as "the use of game design elements in non-game contexts". In the same vein,

EduTrends (2016) defines it as the application of game principles and elements in a learning environment to influence students' behaviour, increase their motivation, and drive participation. Zichermann and Cunningham (2011) defined gamification as the process of game-thinking and game mechanics to engage users and solve problems (in Pektaş and Kepceoğlu, 2019 p. 65).

Gamification refers to the use of game-design elements such as points and game characteristics such as assessment and challenge (Bedwell, Pavlas, Heyne, Lazzara, & Salas, 2012) in non-game contexts in an attempt to achieve positive outcomes to enhance student learning (Deterding, Khaled, Nacke, and Dixon, 2011). Given the implicit belief that games are enjoyable (Von Ahn & Dabbish, 2008), many instructors have integrated gamification into the classroom and researchers have studied the impact of gamification on classroom learning (Boticki, Baksa, Seow, and Looi, 2015; Hamari et al., 2016; Mekler, Brühlmann, Tuch, and Opwis, 2017, in Sanchez, Langer and Kaur, p. 2).

On the other hand, a critique toward this definition comes from Erenli (2013) where she refers to Deterding, Dixon, Khaled and Nacke who state that "gamification is the use of game design elements in nongame contexts". As she evaluates, this statement is broad and simple but does not define the term "gamification" without further explanation. She suggests in order to determine what "game design elements" are, we have to give preferential consideration to the definition of a "game", thus separating it from "non-game contexts"(p.15). However, she finds Caillois's definition as promising: Caillois defines a game as an activity that must be fun; the activity is chosen for its light-hearted character.

It must be separate: that is, it is circumscribed in time and place. It must also be uncertain; in other words, the outcome of the activity must be unforeseeable and it must be non-productive; namely, participation does not accomplish anything useful. It must be governed by rules; the activity has rules that are different from everyday life, and it must be fictitious: that is, it must be accompanied by the awareness of a different reality. Erenli disagrees with Caillois in that participation does not

accomplish anything useful. She says that this must be discounted since non-productiveness does not apply in the education context. She believes that gamification can prove the opposite. She further claims that the definition of "gamification" should thus be amended to "Gamification is the use of game elements in contexts that originally had no link to game-related elements." The more non-game-related elements receive gamificational treatment, the more they drift towards game-related elements. She concludes that it would be a shame if educators were not able to make teaching and learning a bit more joyful – especially when neither teachers nor students need to learn a new skill to be able to take part in a gamified education class.

3. Flow theory

Before moving on to the reasons why we play games, it may be illuminating to refer to the flow theory by Csikszentmihalyi (1975). In positive psychology, a flow state, also known colloquially as being ‘in the zone’, is the mental state in which a person performing some activity is fully immersed in a feeling of energised focus, full involvement, and enjoyment in the process of the activity. In essence, flow is characterised by the complete absorption in what one does, and a resulting transformation in one's sense of time (Beard, 2014).

Csikszentmihalyi, known for his flow theory, explains that flow is “a state in which people are so involved in an activity that nothing else seems to matter; the experience is so enjoyable that people will continue to do it even at great cost, for the sheer sake of doing it”. Csikszentmihályi identifies six factors encompassing an experience of flow. These are:

1. Intense and focused concentration on the present moment
2. Merging of action and awareness
3. A loss of reflective self-consciousness
4. A sense of personal control or agency over the situation or activity
5. A distortion of temporal experience, one's subjective experience of time is altered
6. Experience of the activity as intrinsically rewarding, also referred to as autotelic experience

As they suggest, those aspects can appear independently of each other, but only in combination do they constitute a so-called flow experience.

Additionally, psychology writer Cherry adds three more components as part of the flow experience:

1. Immediate feedback
2. Feeling the potential to succeed
3. Feeling so engrossed in the experience, that other needs become negligible. [https://en.wikipedia.org/wiki/Flow_\(psychology\)](https://en.wikipedia.org/wiki/Flow_(psychology))

In his later studies, Csikszentmihalyi together with Montijo and Mouton (2018), argue that talent, giftedness, creativity, and elite performance are not solely the products of innate genetic gifts resulting in superior abilities. Instead, he agrees with Simonton, 2014; Subotnik et al., 2011 and says that the most important thing is to understand the dynamic interplay between individual abilities and environmental opportunities. The experience of flow is influential in the development of both the individual and society because it requires an ongoing balance of challenge and skill, immediate feedback, clear and proximate goals, and also serves the development of an increasingly complex self, which is capable of expressing the full range of human potentialities. By providing opportunities for these types of optimal experiences in daily activities, parents, teachers, gatekeepers of social institutions, and policy-makers can serve the development of creative individuals and the evolution of culture (p.225).

Beard (2015) held an interview with this founding father of positive psychology and the creator of flow theory, which he studied for over four decades. In harmony with the above description, Beard writes about flow theory, which was first defined as a holistic sensation that people have when they act with total involvement (Csikszentmihalyi 1975). Beard continues by clarifying the situation as a very positive psychological state that typically occurs when a person perceives a balance between the challenges associated with a situation and their ability to meet the demands of the challenge and accomplish.

In addition, Beard lists the nine elements of flow (p. 353):

1. challenge-skill balance,
2. action-awareness merging,
3. clear goals,
4. unambiguous feedback,
5. concentration on the task at hand,
6. sense of control,
7. loss of self-consciousness,
8. transformation of time, and
9. an autotelic experience.

Gilyazova (2020) writes about how the digital turn in Russian education brings to the fore the problem of students' motivation, engagement and enjoyment. It is one of the most challenging problems inherent in all forms and levels of education, especially in e-Learning. As they claim, gamification may be a partial means to reduce the severity of the educational problems facing learners. This refers to places where gamification has become a recognised technology possessing methodological and didactic advantages that have been actively studied and used over a long period of time.

In their research, they intend to make a theoretical contribution to this field by looking into gamification in terms of philosophical and cultural approaches and analyse motivation theories with regard to gamification. The research results indicate that intrinsic motivation plays an essential role in gamification. It is game thinking that contributes to the formation of internal motivation, in contrast to the game mechanics such as points, badges and leader boards, which is focused on external motivation. Still, they warn that gamification is quite a challenging technology; priority attention should be given to maintaining the balance between its utilitarian (educational) and hedonic (recreational) functions.

In gamification, as distinct from any games (real and digital), entertainment is a method rather than a purpose; forgetting this obvious fact is fraught with negative consequences. However, they conclude that gamification should never be seen as a universal remedy.

4. Why do we play games?

According to Šćepanović, Žarić and Matijević (2015) there are numerous reasons for spending significant amounts of time playing games. Whether games are played for relaxation, sheer enjoyment or to satisfy our need to compete, they are a part of our daily life. Nowadays, game concepts are being increasingly incorporated in areas other than just standard playing environments. Every game has a pre-specified goal to be reached and these may take a variety of forms, such as winning a prize, accomplishing an assignment, beating the competitor, or to be ranked first in the leader board: no matter what form the game element takes, it triggers motivation, engagement, emotion and certain behavioural patterns. To harness this, game elements are implemented in non-game contexts like marketing, business, e-commerce, education, work environment, social media, and the like and the process is named as 'gamification' (p.1).

Gamee.medium.com lists five main reasons as to why we need to play games. First of all, games are fun and a source of positive emotions like curiosity, optimism, creativity, which stay enhanced even hours after we play. Second, winning games makes us (feel) heroic as the competition among peers adds adrenaline. After a success in a game, we are more likely to set an ambitious goal for ourselves, even outside of gaming. Third, games are yoga for our mind; every time we let go, we play well. Fourth, games can slow down aging. It is said two hours of puzzle games per week may slow down the degree of mental decay that comes with aging. Finally, games can even make a surgeon better by means of maintaining eye and hand coordination, especially in fast-paced games.

As a result, we may say that gaming is an inseparable part of today's life and may have a variety of positive consequences on us human beings. Then, we may also need to go through the related literature to find out about the educational field.

5. What does the literature say about gamification?

Kusuma, Wgati, Utomo and Suryapranata (2018) view gamification in educational settings as one of techniques that can increase motivation and

encourage the involvement of users, making learning more fun and interesting. They write about four domains in education where gamification was applied; these are:

1. generic,
2. STEM,
3. history, and
4. language.

They suggest some gamification strategies that could be implemented for future works: in order to intensify the effect of gamification, designers need to mix and match various mechanics, because these can give different effects to the player. For example, giving game points and rewards in the form of badges or trophies may lead to a sense of achievement in students and increase their motivation in using the app while learning the subject at the same time. Using a leader board, on the other hand, may create a sense of competition and students may work more to be first one on the board. They further suggest that school-work given as selectable missions or mini-games gives a sensation of playing rather than doing homework. Providing a ground for students to be able to choose the role they want may give them a chance to express themselves and motivate them. A background story may also give more fantasy, feedback to players will guide them, while adding augmented reality through object recognition and social sharing features potentially improves the interactivity of the gamification model that may result in an improved learning process (p.392).

In line with Kusuma et al, Solmaz and Çetin (2017) touch upon the positive outcomes they reached by using a gamification-based Interactive Response Systems (IRS) with university-level students. In their study, they used IRS, which contained gamification elements to maintain a correspondence: through this, students answered their teacher via computers, mobile devices or QR code cards. In their study, they used a variety of IRSs such as Kahoot, Socrative and Plickers.

When they tried to elicit students' views regarding the procedure, the findings demonstrated that students reacted positively toward the use

of gamification-based interactive response systems in their lessons from a variety of standpoints. First of all, satisfaction levels for gamification-based IRS tools are high. Second, the fun and easy-to-use features of the IRSs are viewed as the most popular features by the students. The use of different technologies, such as the QR code cards, colourful interfaces, and immediate feedback in the answers given to the open-ended questions, were favoured by the students. These increased students' interest toward the course and facilitated their learning. Such a procedure was instructive, in that it prevented students' from becoming frustrated and they also learned things while having fun.

Similarly, we find that Yıldırım (2017) also reports his positive research findings on account of the use of gamification elements in mathematics education. In his study he adopted a quantitative research methodology and a true experimental design using pre-test–post-test experimental and control groups. The participants comprised of 97 sophomores from the Department of Elementary Mathematics Education of a state university in Turkey in the 2014–2015 academic year. As he puts forth, the results reveal that gamification-based teaching practices have a positive impact upon student achievement and students' attitudes toward lessons. Still, he refers to Yılmaz (2015) to emphasise that it is inadequate to gamify a process – even when using as many as three components (points, badges, and leader board) – without other procedures (p. 91). Therefore, the use of achievement scores alone cannot be considered a gamification design. In spite of this caution, he still underlines that a growing body of literature indicates the effectiveness of gamification-based teaching practices on student achievement.

In the same vein, Marcos, Cabot and Lopez (2017) define gamification as the use of game mechanics and game design in non-game contexts to engage users and motivate action. Underlining the potential of gamification in higher education in their study, they focused on competitive approaches and presented contrasting evidence. Using a social gamification approach and a tool designed to address the situated motivational affordances of students such as relatedness, competence and

autonomy, they conducted an experiment to compare students' performance with a traditional blended-learning approach at an undergraduate course. Results suggest that social gamification can be used to improve the overall academic performance in practical assignments and to promote social interaction. However, the results also unveil the need for a deep knowledge of the range of motivations among the students and a careful design of the rewards to be used for the ones who are planning to implement game elements in higher education contexts.

In their mixed method research study, Turan, Avinc, Kara and Göktaş (2016) studied the effect of gamification strategies on students' cognitive load levels and achievements was examined along with student opinions about gamification. In the quasi-experimental part of the study, 6th-grade information and technology course students were divided into two groups and the experimental group was conducted using gamification strategies such as Kahoot and Class Dojo while the students in the control group completed the same activities using traditional methods. The teacher taught the topic, and the students did the given activities. The results show a significant difference between the two groups to indicate higher achievement in the experimental group. Regarding the cognitive load levels, the experimental group also scored higher than the control group. As for the qualitative part of the study, students were interviewed and the analysis reveals that the students had positive views about gamification strategies.

Regarding gamification from the assessment point of view, Wood et al (2013) scrutinise the design of assessments within the virtual environment to contribute to authentic learning. Gamification elements and reward support this: reward, ghost images, save points, multiple lives, and time-and-space control were all used as game elements in their study. On the basis of their findings, they conclude that these elements lead to positive outcomes, which constitutes support for assessment in authentic learning, increasing efficiency, and providing new opportunities for educators. Incorporating these elements may also provide several opportunities for educators in improving student learning by careful

design of assessments, together with additional benefits such as self-assessment, problem solving, persistence for more attempts, self, peer, or instructor evaluation (p. 521).

Gamification was used in various educational contexts and online education is not an exception. For example, holding the belief that there are only a limited number of studies conducted on gamification in the context of online education at the time of their study, Antonaci, Klemke and Specht (2019) undertook a systematic literature review on the effects of gamification on users' behaviour in online learning. On the basis of the results, the authors identified and mapped the effects. As they put forth, research on the gamification procedures is maturing, however, they quote (Nacke and Deterding 2017, p. 3) "many studies are still to some extent comparing apples with oranges, testing different implementations of design elements with different effect measures" (p. 3). Antonaci et al thus emphasise that gamification and its application in online learning (especially in Massive Online Open Courses) is still a young field, lacking in empirical experiments and evidence with a tendency to use gamification mainly as external rewards. Furthermore, they write that in their future studies, they plan to explore the effects of their gamification design on human behaviour, contributing to the growth of the field with empirical data as well as demonstrating that gamification can be applied in a more sophisticated way.

Bai, Hue and Huang (2020) approach gamification in a cautious way, stating that although gamification is highly evaluated by the majority as an exciting new method to engage students, evidence of its ability to enhance learning is mixed. As they underline, gamification has already attracted considerable controversy. That is, some argued that gamification is an effective means to generate student interest and trigger motivation, while others labelled it as "nonsense" or "exploitationware" (p.1.) Based on these discussions, Bai et al studied with a large population (3,202 participants) and explored student interventions drawn from 24 quantitative studies that have examined the effects of gamification on student academic performance in various educational settings. The results

reveal a significant overall medium size effect in favour of gamification over learning without gamification and that gamification tends to work better in Asian contexts. (The authors warn the readers that they should approach this finding with caution due to the small number of non-Asian experimental studies available for comparison.) The findings also uncover four reasons for learners' enjoyment of gamification. First of all, (1) gamification can foster enthusiasm, second (2) it can provide feedback on performance and (3) fulfil learners' needs for recognition, and finally, (4) it can promote goal setting. On the other hand, the results put forward two reasons for a dislike of gamification. These are the beliefs that (1) gamification does not bring additional utility, furthermore (2) it can cause anxiety or jealousy. Finally, as for future research to be conducted in the field of gamification, Bai et al suggest that future work should concentrate on teachers' and instructors' attitudes toward gamification.

A group of researchers (Sahin et al, 2017) from a Turkish university who cooperated for a research project explored the probable effects of a gamified learning environment in a distance education programme with regard to minimising the lack of student motivation emerging from separation in time and space from teachers, other learners, and learning sources. Within this perspective, they used of "SoruKüp" a gamified web-based quiz application designed for the use of distant learners. Learners from Open Education Faculty and Business Administration Faculty who used the application at high, medium and low frequencies were selected as participants in the study. The findings reveal that students in a distance-education system evaluated the gamified application positively in terms of triggering motivation positively in the learning process. Components such as the leader board enabled them to evaluate their level and see other participants on the board, as a result of this, they had increased perception of social presence. Similarly, qualities such as points, achievement and progress supported their learning experiences and made the learning experience a sustainable process. The participants found the social graph component that enabled communication with other participants unnecessary, and some of them

stated that they were not even aware of this feature. Some of the participants mentioned that they were disturbed by the potential for in-person contact with participants they did not know (p. 389). Still, the researchers underline that there needs to be more studies conducted in the field to be able to suggest that gamified learning activities are definitely fruitful in creating motivation in distance education programmes.

Likewise, Dicheva, Dichev, Agre and Angelova (2015) in their study touch upon some major obstacles and needs, such as the need for proper technological support, and for controlled studies demonstrating reliable positive or negative results from using specific game elements in particular educational contexts when gamifying the environment. They warn that though we encounter promising results about gamification, more substantial empirical research is needed to determine whether both extrinsic and intrinsic motivation of the learners can be influenced by gamification (p.75).

Going through the literature, we come across another study conducted in the Turkish context at university level by Pektas and Kepceoğlu, (2019). In their case study, they investigated what prospective science education teachers think about the use of gamification in education. The researchers elicited forty-four participants' opinions about the use of gamification in education after a four-week implementation of gamification. The results unveil the benefits of gamification as perceived by the prospective teachers. The benefits cited were such as an increase in motivation, saving time, and preventing cheating, as well as limitations such as difficulty in classroom management and technological problems. Furthermore, the participants noted that gamification applications could be used in the assessment of instruction. The researchers warn that the study was carried out with respect to the playing practices in the teacher training period however, it would be beneficial to study the different teaching levels and apply the practices in different courses to diversify the results.

To find out about whether gamification can improve the students' engagement and quality of learning (and by doing so, have a positive

impact on their marks) or is just an *en vogue* notion with no practical application, Laskowski and Badurowicz (2014, p.971) conducted an experimental study with students of Masters' studies. They found that gamification led to higher attendance levels and a higher amount of homework completed per person: on the other hand, higher average final mark in non-gamified groups were also revealed. As the results show lower exam scores on behalf of the gamified groups in this study, the authors underline the need for replications of their study with larger groups to reach more fully proven results.

In order to provide a current state-of-the-art of empirical work regarding gamification in higher education and STEM and to find gaps in existing studies, Ortiz, Chiluiza and Valeke (2016) went through 562 articles in the related literature. They adopted a systematic manner and thus narrowed down their focus by means of pre-set inclusion criteria for the studies to search. They went through Web of Science articles on higher education published between 2000 and 2016 that considered graduate and undergraduate students in the STEM knowledge fields, and finally, were set up on authentic contexts.

The findings reveal that gamification started to appear in scientific articles beginning from the year 2011. The majority of studies conducted on gamification were from European countries followed by the United States of America, Asia and Africa. In general, quantitative research methods were used in the studies, then mixed method and qualitative designs were utilised. Sample sizes of the studies varied from 11 to 2263 participants. Regarding the elements used in the studies, as the most frequently used ones, we encounter a combination of elements. Badges, points, challenge, leader board and quests followed. Computer science, science/technology, maths, and chemistry were the STEM fields that experimented with gamification.

The results reached at the end of the studies show that the majority had positive outcomes, followed by negative, neutral and mixed. The authors suggest that there have to be:

- controlled studies carried out of unique gamification elements to determine their individual effect on students;
- studies set up in other STEM areas;
- development of more complex models to study the impact of gamification through the inclusion of mediating or moderating variables such as motivation, personality, and game preferences; and lastly,
- the design and adoption of high quality research instruments to develop valid and reliable research results (p.6555).

Similarly, researchers from Finland, one of the countries where studies on gamification were most frequently conducted, made and account of the articles published in the field (Majuri, Koivisto and Hamari, 2018). As they report, gamification appears to signal achievement and progression, however variations in social and immersion-oriented factors are much less common in the studies. The results are mainly focused on quantifiable performance metrics and are strongly positive in their orientation. The writers suggest increased attention on contextual factors and study designs in future research endeavours.

Allabasi (2017) explored gamification from the perspectives of students from a higher education context. The research findings signal a positive attitude toward gamification. On the other hand, for more fruitful learning outcomes, students emphasise the need for effort-demanding, challenging, sophisticated learning systems. These need to increase competency, and enhance recall memory, concentration, attentiveness, commitment, and social interaction.

Similarly, Kirillov, Vinichenko, Melnichuk Melnichuk and Vinogradova (2016) report that gamification enables one to create conditions supporting students' motivation for a long period of time, while turning their training into an interesting educational game. It contributes to the refinement of students' adoption of learning material: it reduces the level of stress while waiting for the evaluation of their skills and knowledge, changes the behaviour of the students, and it promotes the formation of new habits. Furthermore, throughout the study students reported their positive emotions, that they felt alert and alive, which in turn served as the basis for the gamification implementation.

In line with the above discussions, Looyestyn, Kernot, Boshoff, Ryan, Edney and Maher (2017) provide the gamification users with a range of aspects to consider before they come to a totally positive set of conclusions for the usefulness and effectiveness of gamification. As a result of their investigation into conducted studies conducted, they summarise that gamification promises to increase engagement with online programs.

Gamification has been used primarily in education and market research contexts, with reporting standards and methods of engagement varying amongst studies. The results of the studies they analysed imply that gamification positively impacts engagement and downstream behaviours such as academic performance. In addition, leader boards may be a particularly effective gamification feature: however, more research is required to confirm this.

We need more systematic and well planned research studies to be sure about the effectiveness of gamification in different settings, and to investigate how gamification can be used to increase long-term engagement in online programs. In short, if we do not approach gamification with caution and investigate the issue from an objective perspective, we may easily jump into faulty assumptions.

Deif (2017) offers an application in gamification assessment in the context of lean thinking and integrates the social-processing criterion with motivation and cognition used in game education assessment. As a consequence of rigorous statistical and comparative analysis of his data for the study, he finds that in teaching lean thinking, gamification has the potential to motivate students to engage in the classroom. He also concludes that it gives teachers better tools to bring a practical and applied sensibility to students and means students bring their full selves to the pursuit of learning. Finally, as in the other studies above, he underlines the value in selecting carefully, systematically and with well-structured designs. He further suggests that lean games need to be adapted to align with the higher education pedagogical dynamics as well as with the limited industrial experience of students (p.371).

6. Conclusion

In the evidence we obtain from most of the studies conducted in the field of gamification, in a variety of educational contexts and with different purposes, we find that in spite of the positive result we observe that almost all studies end with a warning that the results need to be interpreted with caution and that new studies need to be conducted in order to be able to generalise the findings.

Accordingly, with all that ten-year hype around gamification, it has become a field that still needs further scoping studies, but gamification exists and evolves as a research niche in the area of educational research. The research agenda is far from being straightforward, though it is full of new green shoots. The present-day research goes beyond the early studies on the game potential for education and a limited range of game-based learning technologies. More studies come out to analyse the psychological mechanisms behind gaming for learning purposes and game-based learning; learning theories are explored to find more profound underpinnings for gamification by Raitskaya and Tikhonova, (2019, p.5).

In addition, we need to keep in mind that gamification of education is extremely sensitive to context. There is no once-size-fits-all model for the successful gamification of a classroom. By utilising gamification carefully, teachers can direct their classroom environment towards success in raising both engagement and achievement. As with any pedagogical framework, an educator must be careful to consider the context in which they are teaching: who their students are, and what the shared goals of the class are. When these are considered, and the educator gives themselves the freedom to fail, gamification of the classroom can lead to increased student engagement and success (Stott and Neustaedter, 2013, p.12).

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