APPLICATION AND POTENTIAL BENEFITS OF GAMIFICATION IN EDUCATION

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Abstract: *Gamification is a term used for the process of applying elements of games to contexts that are not closely related to gaming such as business and education but can also be social networks and marketing. The elements of the games used can be the design and logic of the games among others, all with the aim of achieving motivation, involvement, promoting learning and problem solving. Since 2010, interest in gamification has grown in scientific circles, although this term and practice have existed since the 1980s. Gamification is a part of the innovation in education that is related to group learning supported by Computer Supported Collaborative Learning (CSCL) technology as well. This paper primarily describes an overview of the situation in the above-mentioned field dealing with gamification and its application to education and draws a conclusion that shows the potential benefits that gamification brings to students on various levels.*

Keywords: *E-Learning, Gamification, Group Learning*

1. INTRODUCTION

The term gamification in this paper is taken from Lovrenčić et al. (2018) and refers to what gamification is in English, that is, by definition, the application of game elements to non-game-related contexts. (Deterding et al. 2011) These contexts can be business, marketing but also educational which will be the focus of this paper. First of all, we should look at the key aspects of games that have a role in gamification and enable its application to the educational process. These aspects are:

- Beneficiaries - all who participate in the gamification process (students and pupils in the case of this research but may also be employed.

- The tasks that users perform as part of the process and their progress towards meeting the objectives.

- Points accrued for successfully completed tasks.

- Levels that users pass in relation to the number of points.

- Badges that users receive based on their success in activities.

- Ranking users based on their achievements.

The most suitable area of education, as Kiryakova et al. write, for the implementation of gamification is information and communication technologies because the

process of student progress and their data can be automated so that the software creates detailed reports about it. The conditions for the existence of gamification and the steps that need to be taken to make it fully realized are discussed below. The first is to determine the users and their characteristics. The question that arises at this stage is whether students will be able to interact with the material and participate in the events that are part of this process. In the second place is the formulation of clear goals of gamification as a process and their definition so that no activity is aimless. The third is the concrete formulation of activities related to gamification and which will meet educational goals in this innovative way. These activities must meet certain conditions in order to be acceptable for the educational process. They must be such that they can be repeated, the user should be able to repeat one activity or task several times because that is where learning begins. The next is that the activities can be achieved based on the level of knowledge of the users. The level of difficulty should definitely increase and each new task should be more difficult. Finally, for the same skill, there should be several different tasks so that different types of students can fulfill them according to their own learning strategies. The fourth and final condition for gamification would be the formulation of specific elements and mechanisms of games to be implemented in the gamification process. (Kiryakova et al. 2014)

2. BACKGROUND

As Arnold (2014) writes in his paper, the logical beginning of the implementation of gamification is through online courses, their interface enables an easy transition from textual to innovative and digital. A study by The New Media Consortium from 2013 shows that whenever students need to implement critical thinking the implementation of gamification and any kind of simulation of the situation from the real world proves to be useful.

Stott et al. (2013) in their paper Analysis of Gamification in Education presents some specific case studies of the implementation of gamification in education and work with students. The first deals with Professor Clifford Lampe from the University of Michigan, who presents his course "Introduction to Information Studies" almost entirely through a video game in which students participate and thus show their knowledge. The first thing he cites as positive is that students themselves choose which tasks to do from the ones offered and thus have the freedom to choose. They do this at the beginning of the semester where they choose what their quest log will look like in which they want to participate. Also included in this is leveling which allows some higher level tasks to remain locked until the student has done enough lower tasks to get it. Another positive thing mentioned by the author of this paper is that students get a much faster response (feedback) to their work and progress in this way through the so-called grade master within the game. What mainly appears as a

critique of gamification is the absence of group work, but Professor Lampe also included in his course play the possibility for students to enter groups within the game called guilds that can change during the course and thus participate in group tasks. As a result of this kind of work, Lampe states that students better retain and remember information because of the so-called 'shock value' learning that links information to experience as it is acquired.

Another case study by Stott et al. (2013) states that it is different from the first in the sense that there is no one course for which the game is used, but it is at the level of all courses attended by students at the University of Rochester (Rochester Institute of Technology). This is a game called Just Press Play and unlike the previously mentioned one which aims to improve the knowledge and memory of specific material, PPP deals with positive academic behavior among students on campus which further leads to better student results. It organizes workshops, seminars and lectures that serve students to improve their knowledge and socialization. Each student has a physical card with implemented identification via radio frequency, ie RFID (radio-frequency identification), which he uses for everything he does on campus, and this is further stored on his profile online. This can further be used by the student to provide information to his/her potential future employer as evidence of his / her academic behavior, additional content he/she attended and did during his/her studies. Stott et al. (2013) especially emphasize that this game does not have a grade or ranking, which eliminates anxiety among students to collect these achievements on their online profile. Progress allows further unlocking of some achievements and tasks that students can achieve but also to compare with other students on the platform, which ensures the motivation of students to use their PLL. The focus of this game is primarily intrinsic motivation in students.

Stott et al. (2013) also conclude from this that students through gamification are the ones who make decisions, they are not just consumers of what studies require of them and what someone else formulates. They are the ones who decide in the games which move to take, which has proven to be a good motivator for further progress. This paper also states how important the context is for the implementation of gamification, that is, who the students are, what is the subject of their studies and how they are conceived.

3. APPLICATION AND BENEFITS

Muntean (2011) in his paper Raising engagement in e-learning through gamification shows the way the application is gamified, which educational aspects are most suitable for it as well as some of the potential disadvantages of this system. The most suitable for gamification are linear e-courses which, due to the nature of the data they provide, represent the basis for gamification. The course studied in this paper is an information retrieval course for distance

learning students. Instead of dividing the course into several parts, Muntean (2011) proposes a cascading structure, where the course and course information are divided into the smallest contents of the material and that the student gets a certain number of points at the end of each part, which he unlocks by landing. The author also suggests creating avatars as the most important item that will allow the student to personalize the course as in games. Constant feedback is also important for tracking errors, as well as creating a progress bar. Defining deadlines also encourages motivation that promises that the student will return to the application periodically and relatively regularly.

Farzan and Brusilovski (2005) also suggest that gamified courses be as social as possible, that is, to allow access to other students to create a competitive atmosphere and increased motivation. This is followed by Muntean (2011) who suggests that application badges be assigned for commenting and inter-student interaction. Students should also receive notifications about what awaits them in the course because it creates a good flow of learning. What the author concludes from this paper is that the most important factor in gamification is how much users are engaged because it turned out that visits to applications, time spent on them and with materials are key to the success of a gamified course. What Muntean (2011) cites as a potentially bad side of gamification is the replacement of intrinsic motivation with a completely extrinsic, ie external, but what he proves is only the growth of extrinsic, ie external motivation.

Hakulinen, Auvinen and Korhonen (2015), Lee and Hammer (2011) and Muntean (2011) argue that gamification has positive effects on student motivation, participation, and engagement during the course as well as those students are better prepared to fail through gamified scenarios where they are allowed to fail multiple times. Dominguez et al. (2013) proved on the other hand that although the gamification of an online learning application contributes to the motivation and increase of active students participating in the learning process, there are no significant results on the final grades of those students. Hanus and Fox (2015) also conducted an experimental study where they studied students 'motivation, satisfaction, effort, and grades during a sixteen-week fictional curriculum and concluded that these students had even worse results than those in traditional courses. This was tested when Marcos et al. (2014) conducted an experiment using social networks and learning systems that used gamification. Students who are accustomed to such work and those who have traditionally studied in their courses participated. Although more motivation, competitive spirit and cooperation were observed in those who were accustomed to gamification, students who traditionally studied still had better results. Further, this is attributed to what Hwang et al. (2013) that is, with a large amount of

competitive spirit that occurs in gamification on regular courses, there may be increased student anxiety. The authors also refer to Kirschner et al. (2006) on the fact that students in gamified courses sometimes receive so much information in a short period of time that they exceed the memory capacity.

4. GAMIFICATION IN EDUCATION

The initial thing that is the focus of this paper is the level of education at which gamification occurs most. All papers used for the purposes of this research cite higher education as an example, that is, university education most often. It has not been determined whether this is really the case in practice, but other levels of education are usually not included in the research. Gamification in its essence can potentially have good results at lower levels of education, especially among younger students, so it remains open for further research.

Another thing that has been noticed in the works covered in this study is the sphere of application of gamification. Case studies show that this is most often the field of technology and communication and less often the field of social sciences. The systematic nature of the material and its close connection with technology may be one of the reasons for this result. One of the successful cases of applying gamification to the social sciences is the Duolingo web application, which represents language learning by collecting points, passing levels, and getting badges, and the success of this application was recorded in a study from 2012, where the emphasis is on language acquisition speed. (Vesselinov & Grego, 2012) This represents a potential encouragement for the further implementation of gamification on learning.

What runs through almost all studies of gamification is motivation. Motivation is one of the key aspects of gamification as well as goals. An increase in students' motivation for the order was noted in all experimental works that were processed, even those in which an alleged decline in results was found. Especially in studies where two groups of students are observed, those who learn traditionally and those who learn through playful content. From the attached papers, it can be concluded that the motivation comes primarily from the competitive atmosphere with other students, which comes from the ranking of users of different gambled content. The next reason for the growth of motivation among students is the system of badges and points that unlock further content and ultimately enable students a higher place on the ranking list. Also, the anticipation that starts from collecting points to unlock new content can be a clear motivator. Control over the content of learning materials can prove to be another way to raise a student's motivation to a higher level. (Hakulinen, Auvinen & Korhonen (2015); Lee &

Hammer (2011); Muntean (2011); Marcos et al. (2014); Dominguez et al. (2013); Turan et al. (2017))

In addition to motivation, another positive outcome of gambled content is student participation in activities. Several studies show that involvement in the materials and content of games is at a high level and that students participate more in gambled content than in traditional. Some authors have questioned the possibilities of group work when it comes to gamification, however, a case study by Stott et al. (2013) show that group work can very well be achieved in gamified content through grouping students in the online world and their work on common tasks within the game. The social factor also appears in the work of Farzan and Brusilovski (2005) where the emphasis is on the fact that students in some gambled content get extra points if they comment and socialize with other students within the game, which certainly increases interest in group work. This can further create a very favorable atmosphere among students which creates a sense of belonging to their group and a positive competitive atmosphere among different groups. The gambled content is clearly goal-oriented, and this makes them different from traditional learning which generally does not have a clearly defined goal of a task or action. Some authors argue that this burdens students, and although it has been proven that the cognitive burden grows from such activities it is negligible compared to the fact that all other positive aspects of learning grow, as well as results in groups comparing playful and traditional content.

5. CONCLUSION

What is mentioned in the works on gamification as a positive side of the same is the freedom to fail because students are allowed to repeat the same task or part of the game several times, which eliminates the fear of failure for the first time. This further creates an atmosphere of security and eliminates anxiety on the first try at a task. Finally, the retention of learned content has been shown to last much longer after gambled content than after traditional, which is also if not the most positive impact of gamification on education. The application of gamification to education largely depends on the context to which it is applied, but it is indisputable that some of the benefits of this way of learning are universal for all contexts. Although most of the papers deal with university education, the research results are convincing about the strengths of gambled materials. Further research can potentially address other levels of education as well as different contexts to provide rounded information on the potential benefits of gamification on education. Also, future research may address some of the negative outcomes of gamification such as cognitive burden to determine the extent to which it is represented throughout the process. The current review of the situation shows that the good sides of this way of working still prevail.

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