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Gamification in Education

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Dedication

To our dear parents, sisters and brothers.

To all our friends with whom we shared the university life.

Acknowledgments

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Abstract

Today's schools face major problems around student motivation and engagement. Gamification, or the incorporation of game elements into non-game settings, provides an opportunity to help schools solve these difficult problems. However, if gamification is to be of use to schools, one must better understand what gamification is, how it functions, and why it might be useful. Gamification is a powerful tool for catalyzing attention, focus and investment . gamification can be applied to associate fun with learning. In essence, the student is hooked by the idea of the game, pulled forward by curiosity to learn more or win, and ends up enjoying the experience, becoming engaged in the idea or activity and opening themselves up to the possibility of learning.

This paper consists of two sections. Section one deals with introduction, definitions and concepts of gamification. Section two sheds light on educational gamification, issues impacting game based learning, characteristics of gamification goals and techniques and advantages and disadvantages.

Finally, the conclusion sums up the findings of the study.

SECTION ONE: GAMIFICATION

1.1 Introduction

The term “gamification” is quite recent: according to (Deterding, *et al*, 2011:2425) is a Systematic Mapping Study its first documented and official use is in 2008 but it did not see widespread interest before the second half of 2010. Nevertheless, the concept itself is not new. For example, badges and ranks have been long used in the military, in the early Soviet era game elements have been used by the Soviet Union leaders as an alternative for monetary incentives for conducting at work.

Gamification refers to the application of game dynamics, mechanics, and structures into non-game environment which means using non-serious elements into serious context (stott and neustaedter, 2007:1).

Gamification is also used in several different and various contexts mostly business and marketing, but one mainly wishes to demonstrate its usage and importance in the educational environments (Deterding,et al :2426).

Traditional schooling programs are continued as incompetent and boring by many students. Although teachers continuously try to use instructional methods, it is largely agreed that today's schools face major problems around student motivation and engagement. This traditional school programs led to miscommunication between the teacher and the student and it causes lack of motivation and creativity around the students these problems led to the discovery of a new technic called Gamification (Lee and Hammer, 2011:3).

Games and game like elements have begun to concur the world with it bran new methods and technics. "Gamification, defined as the use of gamemechanics, dynamics, and frameworks to promote desired behaviors, has found its way into domains like marketing, politics, health and fitness, with analysts predicting that it will become a multi-billion dollar industry by 2015" (MacMillan, 2011:34).

Gamification aims to exploit the motivational power of games and apply it to real-world issues such as, in our case, the motivational problems of schools. Motivation and engagement are major challenges for the educational school systems (Bridgeland, et al , 2006:).

Gamification's main goal is to raise the engagement and creativity of students by using game-like techniques such as scoreboards and personalized fast feedback that is designed to attract learners in to the process of learning sited in Raising engagement in e-learning through gamification (Flatlaet al, 2011).

1.2 Definitions of Gamification

Gamification maybe defined as the process of adding games or gamelike components to something (such as a task) so as to encourage participation and increase the want for learning It aims to maximize enjoyment and engagement through capturing the interest of learners and inspiring them to continue on learning (Hsin et al 2013:7).

Gamification aims to transform the classroom environment and regular activities into games that allow students to interact with each other and it helps to stimulate and enhance their minds in order for the students to be fully attached with the subject or the topic of the class. Also it is a way of teaching that requires creativity, collaboration and role play. This technic used in the class room to promote learning and deepen student understanding of what is being learned in a gamifiedway (Hsin et al 2013:8).

Hsin (2013:12) mentions that gamification is the "craft of deriving all the fun and addicting elements found in games and applying them to real-world or productive activities" while Ray Wang, describes it as a "series of design principles, processes and systems used to influence, engage and motivate individuals, groups and communities to drive behaviors and effect desired outcomes"

Gamification is defined as the application of typical components of game playing (playing rules, scoring points, competition with others) to other areas of activity, specifically to attract learners in problem solving through a set of challenges that its set for learners to face (ibid.).

Zichermann and Cunningham(2011:65) define the concept of gamification as follows Gamification is the process of game-thinking and game mechanics to engage users and solve problems.

Kappd (2012:64-66) defines gamification in the context of learning and instruction much more broadly as follows: "Gamification (of learning and instruction) is the delivery of content-for a purpose other than pure entertainment-using game-based thinking and mechanics. Theory of fun "a game is a system in which players engage in an abstract challenge, defined by

rules, interactivity, and feedback, that result in quantifiable outcome often electing an emotional reaction".

Finally Muntean (2018:324) defines gamification as the use of game play elements for non-game applications, particularly consumer oriented web and mobile sites, in order to encourage people to adopt the applications

1.3 Concept of Gamification

1.3.1 Intrinsic and Extrinsic Motivation

Intrinsic motivation refers to the internal motivation that is inside the individual which appears as they go through the process of learning. Extrinsic motivation comes from rewards such as prizes or payment that an individual receives that are external to the core learning process .Gamification is regularly censured for depending too vigorously on Extrinsic rewards This is a simple trap to fall into when endeavoring to gamify the learning condition. The key is not to see the two kinds of inspiration as alternate extremes, yet to see them as corresponding. A greatly improved arrangement is to offer extraneous inspiration as reward focuses and leader boards in mix with painstakingly made substance that permits understudies a sentiment dominance and capability as they work their path through the substance (buckly and doyle, 2014:16).

1.3.2 Episodic Memory

Episodic memory refers to memories, often intensely strong, of where a person was and what they were doing at a time when they felt compelling emotion. As solid emotions are frequently experienced from playing games (for instance happiness at winning), it is regularly conceivable to stay data in a player's memory and enhance review from gamification. There is no enchantment recipe for using episodic memory in a gamified condition, yet there are sure perspectives that can be incorporated into request to help support episodic memory (buckly and doyle, 2014:16).

- Add fun to the learning experience
- Use contrasting elements that would not typically go together - such as dinosaurs in a school
- Reward winning, but do not punish/penalise losing
- Balance gaming elements with learning objectives to engage the learners in both the game and the learning process (Ibid)

SECTION TWO

2.1 Educational Gamification

2.1.1 Student Motivation and Engagement

Student motivation is very important, if student don't find motivation in the lessons then they won't be able to understand the essence of the topic. By applying gamification to the class room student could be motivated to learn new things and enjoy otherwise tedious tasks (Hanus and Fox, 2015).

They are two main categories of motivation are the intrinsic and extrinsic. Intrinsic is concern with the students interest in what they learned and the learning procedure itself while extrinsic motivation is about the connection between student and the proses of learning which is separated of content and subject of learning. Depending on how gamification is used, it can ether increase or decrease the level of motivation. The main aim in gamifying any class is to boost the intrinsic motivation.

Buckly and Doyle(2014:22) identify three types of intrinsic motivation :

- The intrinsic motivation to know (the desire to perform a learning activity for the delight one encounters while learning).
- The intrinsic motivation towards accomplishment (the desire to engage in an activity for the joy and fulfillment experienced while achieving a troublesome accomplishment)
- The intrinsic motivation experience simulation (engage in an activity to be simulated)

They also identified three types of extrinsic motivation:

- External regulation (behaviors performed to satisfy an external demand)

- Introjected regulation (activities are preformed to attain ego encasements or avoid guilt)
- Regulation through identification (identify is linked with an externally proscribed behavior and he/she preforms an action to instantiate that identity).

Buckley and Doyle (2012:11) in their summary of their study, that their research demonstrates a number of important points which guide the deployment of online gamified learning interventions and suggest further research in the area. They go on to say that,

First, online gamified learning interventions have a positive impact on learning outcomes. While this is desired by the recognized impediments of this investigation and the way that positive outcomes require careful outline to guarantee that the learning activities prompted a gamification are tied to learning outcomes. This study nevertheless presents a positive picture on the utility of gamification .this positions gamification as a powerful tool for educators teaching at all levels within the education system.

Hanus and Fox (2015:142) also conducted a study about student motivation and engagement. They state that increased social comparison, competition and reward system might have a distractive effect on the long-term for student's motivation, satisfaction, enjoyment and engagement with the class material. Their study concentrate on the long term effect of applying gamification concepts within the educational process.

They recruited 80 students in two separate classes of the same course taught by one of the authors and assembled information at four separate times (time 0, time 1, time 2, and time 3) over the course of 16 week

semester. The classes were divided into a gamified course that requires participation, badge completion, and engagement with an online leader board, and a non-gamified course. Both courses featured the same material, assignments, exams and lectures and they measured motivational and psychological changes as well as behavioral changes. They conducted their study as a longitudinal study to assess how these gamification elements affected students' satisfaction, motivation, enjoyment, empowerment to learn and grades over time (Hanus and Fox, 2015:155).

Students from each course started out at the same levels of intrinsic motivation, satisfaction, effort, social comparison, and empowerment, over time students in the gamified course tended to decrease in motivation, satisfaction, and empowerment relative to the non-gamified course. They also found that the effect of course type on students final exam scores was mediated by their levels of intrinsic motivation where students in the gamified class tended to be less intrinsically motivated at time 3, which caused lower final exam scores (ibid:159).

2.2 Issues Impacting Game Based Learning

Haaranen et al. (2014:73) also have managed a study of game based learning (gamification) in secondary education. In their study, teachers picked one of the three pre-chosen COTS computer games and were then in charge of deciding precisely how, when, and which students would use the games, for planning schemes of work and assessment criteria and for managing all classroom activities. Teachers were free to change or stop the games at any time if they felt it's unsuitable for teaching.

For secondary Schools participated in the study which had a diversity of both rural and urban settings, and were part of both private and state sectors. Three teachers from each school volunteered to participate in the study. The curriculum consisted competency, French, English, physics, design and technology, math. Data collected included Semi-structured interviews conducted at the start and end, all emails between teachers and with researchers and all contributions to the wiki, all lessons plans schemes of work and supporting materials generated teachers final reports on activity and field notes from researchers and two students' research groups (Gee, 2008:89).

What the researchers found that teachers who were teaching on competency based learning were comfortable to use the game based learning or games within their class. Teachers who concentrated on 'soft skills' tended to work with the game in a way that shows high degree of loyalty to the original games narrative and played the whole game. The teachers who were working on a content based curriculum tended to disaggregate components of the game, using only the parts that were appropriate for their teaching activity (Berkling and Thomas, 2013:164).

They discovered that teachers had to take away some of the elements of the games in order to suit there educational purposes or to reinstruct there educational objective in order to enable games fidelity (ibid.).

This raises questions of whether, in our current educational climate and curricular and assessment context, the incorporation of COTS games for learning (rather than the design of bespoke and appropriate games) makes either economic or educational sense for the majority of teachers (Hentenryck and Coffrin, 2014:32).

2.3 Characteristics of Gamification

Gamification seek to increase the student's motivation and to raise the level of commitment to learning the material by employing concepts already familiar to most consumers (Kiryakova, 2.2.)

Stott and Neustaedter (2007:10) also discuss two characteristic of gamification they call the freedom to fail concept and storytelling that are directly related to the application of gamification to education. The freedom to fail concept demands quick and fast feedback that doesn't directly affect the students' final grades but, its encourages gradual step by step learning. Similarity, Storytelling in education increases engagement and progression through content. Andrew Stott and Carman Neustaedter, "Analysis of Gamification in Education," applying the principle "Freedom of choice" include the possibility for students to choose: what type of challenges and activities to complete, for instance, writing traditional essays, completing an open-ended group project, completing an open-ended individual project, or contributing to the class blog .

The principle "Freedom to fail" presumes no punishments on poor performance and normally incorporates permitting students to overhaul and re-submit assignments, or re-take tests, for instance tests which are more unpredictable (O'Donovan et al., 2013). Although this principle is perhaps one of the most controversial for applying in a customary classroom, there are no exact examinations completing particularly its controlled assessment (stott and Neustaedter, 2007:23).

Another aspect of game design that can positively impact learning in the classroom is the use of storytelling and narrative. As Kapp notes, most games employ some type of a story. Monopoly tells the story of becoming rich through owning a property and risking that property through buying and selling it (ibid).

2.4 Goals and Techniques

Educational gamification shows the use of game-like rule systems, player experiences and cultural roles in order to shape learners' behavior and attitude. To fully understand gamification potential wise, however, we must consider how these techniques can be employed in practice. (Lee and Hammer, 2011:14).

2.4.1 Cognitive

Games provide complex system of regulations for the players to discover through active experimentation and discovery. For instance, simple mobile game Angry Birds which asks players to knock down towers by launching birds into the towers out of a slingshot. Players must try to experiment with the game to find out the physical properties of different tower materials, the sling shot ballistics, and the structural weaknesses of each tower. They launch birds into the towers, watch the outcomes, plan their following moves, and execute those plans. In short, players' ergo to beat each level makes them experimental physicists on a small-scale bases (Koster, 2004:69).

More broadly stated, games lead players through the capability process and keep them drawn with potentially difficult tasks. One critical game design technique is to deliver solid challenges that are perfectly designed to fit the player's level of skill, mounting the level of difficulty as the player expertise

grows. Specific, evenly hard, initial goals are motivating for learners Bandura, 1986), and these are particularly the type that games provide. Games provide various ways to success, letting students to pick their own sub-objectives inside the bigger task. This also support and enhance students engagement and motivation (Locke and Latham, 1990:162).

These techniques, applied to school, can change student concepts on learning. Students always are told what to do without understanding the huge usefulness of work that the teacher give .gamification can help students ask, “If I want to master school, what do I do next?” it give students obvious, effective tasks and promises them instant rewards for their work instead of ambiguous long-term benefits. In the best-designed games, the reward for solving a problem is a harder problem. Gamification hopes to make the same true for schools through presenting different levels of problems that students need to overcome (Gee, 2008:176).

2.4.2 Emotional

"Games invoke a range of powerful emotions, from curiosity to frustration to joy". They supply many positive experiences for the students, such as optimism and pride. Crucially, they help students to carry through negative emotional experiences and even to change them into positive ones. (Lazarro, 2004:86)

If students are urged to take risks and experiment, the center is detracted from definite outcomes and re-focused on the way toward learning. The viability of this change in the center is perceived in the current instructional method as appeared in the expanded utilization of formative assessment. Like the game dynamic of having the 'freedom to fail', developmental formative

assessment focuses on the process of learning rather than the end result by using assessment to inform subsequent lessons and separating assessment from grades whenever Possible. The perfect example of an emotional transformation in a game is around the problem of failure. Because games involve repeated experimentation, they also involve constant failure. In truth, for many games, the only way to learn how to play the game is to fail at it consistently; it gives the chance to learn something new each time (Gee, 2008:167).

Games keep this positive association with disappointment by making input cycles fast and keeping the stakes low. The previous implies that players can continue try and try until the point that they overcome the latter means they risk very little by doing so. In the other hand the stacks in schools are high and the feedback cycles long. Students have few chances to try, and when they do, it is high stakes. Little wonder that students experience anxiety, not anticipation, when offered the chance to fail (Pope, 2003:9).

Gamification offers the promise of flexibility in the face of failure, by showing that failure is a necessary step and an important part of learning. Gamification can shorten feedback cycles, give learners low-stakes ways to assess their own capabilities, and create an environment that rewards effort not mastery. Student in return, can see opportunity in failure and that failure is the first step to success, instead of becoming helpless, fearful or overwhelmed. (Locke, 1991:89).

2.4.3 Social

Games allow players to try out new characters, identities and roles. Games ask them to make new decisions from their current level that they reached. Players may take the role gun-toting mercenaries, speedy blue hedgehogs, elven princesses, and more, Players also adopt roles that are less straightforward

fictional. Students get to discover new sides of themselves through discovering the different levels of the game. For example; a shy teenager might become a guild leader, commanding dozens of other players in epic battles against legions of enemies (Squire, 2006:57).

Building up a solid school-based character helps to connect students with learning in the long run. However, numerous students don't feel like they can "do school" or don't see themselves in an traditional school system (Pope, 2003) Ibid. For these students, gamified conditions can give a chance to try on the unfamiliar identity of a scholar increasing the level of adaptation of the students (Nasir and Saxe,2003:21) .

Gamification additionally enables students to freely identify themselves as scholars through playing the game. the game can give social validity and acknowledgment to scholarly accomplishments, which may somehow or another remain imperceptible or even be maligned by different students. Recognition can be provided by the teacher, but gamification can also allow students to reward each other with in-game currency. Such a design encourages students to reinforce the development of a school-based identity in other students as well as in themselves (Lee and Hammer, 2011:87).

The gamification procedure in education comes down to the components that are connected to the learning program. As said before, gamification is the expansion of game like-components, likewise called game mechanics, in non-game settings. Game mechanics can be named self-components or social-components (ibid.).

Self-elements can be points, achievement badges, levels, or simply time restrictions. These elements get students to focus on competing with themselves and recognizing self-achievement.

Social-elements on the other hand, are interactive competition or cooperation, like for example leader boards. These elements put the students in a community with other students, and their progress and achievements are made public (Hsin et al, 2013:13)

A well-constructed gamification system can help players take on meaningful roles that are fruitful for learning. By making the improvement of the new character enjoyable and plus we can help students think differently about their capabilities in school by rewarding their accomplishments increasing their confidence through the process of gamified learning (Lee, and Hammer, 2011:89).

2.5 Advantages and disadvantages

The strengths of gamification and schools can complement each other but they are not necessary so. The specific ways in which gamification and schools could make each other worse. Mixing between education and game components could turn out like peanut butter meeting chocolate: two great tastes working together, leading to outcomes that are especially significant for developing 21st century skills. Gamification can give a great level of motivation for the students to interact inside the classroom, give teachers much better tools to guide and reward students, and make students engaged enough to bring their full attention to the educational process being learned, it can show students that learning can be a pleasant experience also, the obscuring of limits amongst casual and formal learning can move students to learn in life wide, lifelong, and life deep ways (Lee and Hammer, 2011:92).

The challenges, however, are also significant and need to be focused on. Gamification might soak up teacher resources, or give students the idea that they should learn only when they are provided external rewards. On the other hand, playfulness requires freedom - the freedom to experiment, to fail, to explore multiple identities, to control one's own investment and experience. By making play obligatory, gamification might create experiences that are rule-based which feel just like school. Instead of chocolate and peanut butter, such projects are more like chocolate-covered broccoli that means classes would be fun and full with benefits for the students (Klopfer, et al , 2009:42).

To put it plainly, some gamification projects will succeed, and others will fall flat. Gamification isn't an all-inclusive panacea. On the off chance that we are to enhance the chances of gamification offering some benefit to schools, we should painstakingly plan gamification ventures that address the genuine difficulties of schools, that emphasis on the regions where gamification can give the greatest value, that are grounded in existing research, and that address the potential risks of gamification for the two games and schools. Couple with the formation of gamification ventures, we must develop significant appraisals of whether they are accomplishing their goals (Lee and Hammer, 2011:93).

As gamification spreads all through this real world, there is little inquiry it will likewise affect our schools. By leading with research-based, theory-driven gamification projects, we can work to ensure that the impact of gamification is a positive one. Gamification will be a piece of students' lives for a considerable length of time to come. On the off chance that we can bridle the vitality, inspiration and sheer capability of their diversion play and direct it toward learning, the students can be given the instruments to end up plainly high scorers and victors in the real world (ibid.).

Conclusions

Gamification does not imply creating a game. It means makes education more fun and engaging, without undermining its credibility. Gamification helps students gain motivation towards studying, and because of the positive feedback they get pushed forwards and become more interested and stimulated to learn. Gamification can constitute a powerful boost to determine them to study/read more. Gamification, the application of game elements to non-game settings, continues to grow in popularity as a method to increase student engagement in the classroom

The goal of this study was to review the directions and tendencies of the conducted research on the application of gamification to education. Today's schools face major problems around student motivation and engagement. Gamification, or the incorporation of game elements into non-game settings, provides an opportunity to help schools solve these difficult problems.

Gamification in education is still considered an emerging technology. Studies have shown that when teacher look at intrinsic and extrinsic motivation using gamification, that learners mostly participate in gamification because of intrinsic motivation. However, some learners transitioned from using intrinsic motivation to extrinsic motivation due to the types of game mechanics used in the gamified environment.

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