

ANALYSIS OF GAMIFICATION OF EDUCATION

Emel Koc Avsar
Okan University, Istanbul, Turkey
emel.koc@okan.edu.tr

ABSTRACT

In the last decade, there has been considerable literature on gamification of education. Based on the resulting experience, the educational community indicate consensus on necessity of “gamification” of education to improve the quality of education. The study presented here is motivated by this necessity and aim to review literature related to the use of gamification of education.

“Gamification” is about motivation and engagement. Making learning fun does not require huge investments in technology. Instead, focusing on the ways that entertainment technology engages us can result in methods that we can transfer to any learning situation. Many educators have attempted, with varying degrees of success, to effectively operate game elements to increase student motivation and achievement in the classroom.

There have been many obstacles in their courses as the intellectual challenges of mastering the content of the course. To overcome these obstacles, students are expected to engage in critical thinking and push themselves to consider new ideas. In order to overcome these obstacles, a large collection of proven techniques such as abstraction, decomposition, iteration and recursion which has called computational thinking will be integrated to gamification of education.

Keywords: Gamification, gamification of education, computational thinking

1. Introduction

Gamification, defined by Deterding at al. as the use of game design elements in non-game contexts [1]. Also, gamification can be defined a process of providing affordances for gameful experiences which support the customers overall value creation [2]. Although gamification has quite a few definitions, they all seem to show gamification to the goal of engagement and motivation.

Motivation and engagement are significant milestones for the completion of a task or confidence of a specific behavior. In today’s digital generation gamification in education has become a popular tactic to encourage specific behaviors and increase motivation and engagement. These are intelligent role because identifying, remembering and understanding were incorporating lower order, progressing to higher order thinking skills in subsequent levels such as analyzing, evaluating, critiquing, summarizing and finally arriving at the highest order thinking skills in the final levels as composing, creating, designing, planning and inventing [3].

There are two types of motivation such as extrinsic and intrinsic. Extrinsic motivation exists when motivation is aroused by forces outside of an individual. Intrinsic motivation is aroused from within an individual. Intrinsic motivation remains an important construct, reflecting the natural human propensity to learn and assimilate. However, extrinsic motivation is argued to vary considerably in its relative autonomy and thus can either reflect external control or true self-regulation.

The aim of this study to analyze the gamification of education and to build a framework related to this topic. Here I review the gamification characteristics, strengths and limitations in general. In addition to this, the underlying objective is to build a framework to understand the students’ point of view to use gamification in education. The next step of this study is to conduct a questionnaire for students and then to prepare a curriculum depend on their interest. At the end of statistical analyses of the data obtained by questionnaires, I will develop the most appropriate gamification tool based on students’ requirements and integrate it to the current education system within the University in Turkey.

The paper is organized as follows. Section 2 has included gamification in education analysis of gamification. Section 3 describes framework for development of an integrated module. Consequently, section 4 concludes the paper and prospects future work.

2. Gamification in Education

Computer science/IT educators are more preferred gamification. Utilizing gamification assumes a certain type of environment that supports incorporating and visualizing the selected game mechanisms and dynamics. I believe that the effective classroom adoption of gamification implies both certain technological infrastructure coupled with an appropriate instructional framework. Today's course management systems, however still offer restricted support for gamifying courses. Since the general population of instructors lacks the necessary skills and time for creating, adopting, and/or maintaining an appropriate supportive technological infrastructure, the early application of gamification to learning emerged mainly in CS/IT disciplines. The lack of proper technological support is one of the major obstacles for applying game elements to education. Thus, the development of software tools that can efficiently support gamification in various educational contexts would contribute to a larger-scale adoption as well as to research on the feasibility and efficacy of the gamification of education.

Finding and sharing of new ways of applying gamification learning contexts that are not limited to extrinsic rewards like achievements and badges and that are more meaningful to the students is very important for increasing the application of this emerging technology in education. While the concept of gamification may look simple, the analyzed work demonstrates that gamifying learning effectively is not.

In the literature, there are underlying dynamics and concepts found in game design are shown to be more consistently successful than others when applied to learning environments, these are: freedom to fail, rapid feedback, progression, storytelling [4]. 'Freedom to fail into classroom design is noted to be an effective dynamic in increasing student engagement. This dynamic provide student is using ongoing self-assessment or that the teacher is using ongoing assessment to inform their teaching [5]. Feedback is already a key element in education. If educators can increase feedback mechanisms, learners will have different ideas from different discipline. Progression has defined in the form of levels and missions throughout game design. Hackathorn and Lieberman used Bloom's Taxonomy as a guide in designing the progression of the course. To illustrate this, lower order thinking skills into the first stages (identifying, remembering, understanding), higher order thinking skills in subsequent levels (analyzing, evaluating, critiquing, summarizing) and finally arriving at the highest order thinking skills in the final levels (composing, creating, designing, planning, inventing) [6]. Another aspect of game design that is called storytelling can positively impact learning in the classroom.

3. Framework for Development of a Gamification in Education

According to Werbach [7] gamification has put forward an iterative user centric six step: 1. Define objectives, 2. Delineate target behaviors, 3. Describe the players, 4. Devise the activity cycles, 5. Do not forget the fun, 6. Deploy the appropriate tools. The first five steps of this approach show the sociocultural aspect of gamification. And also step 6 is the deployment of technical components. Successful games use balanced combinations of some of these keys or categories.

The uses of educational games as learning tools reinforce not only knowledge but also important skills such as problem solving, collaboration and communication. Using gamification in education, improve learners' engagement and motivation. Helping educators find the balance between achieving their objectives and catering to evolving student needs. Table show that result of the real world connections examples suggested by the experts.

Topic	Example
Logic	Computer software, algorithms and electrical circuits
Relations, functions and operations	Machines, input/output and factory/product relations
Sets	Classification of distinct objects which have common properties
Numbers	Calculations in shopping, bank accounts and grades, word problems of numbers
Polynomials	Architecture and civil engineering
Quadratic equations, inequalities, and functions	Mathematics used in mechanics (vertical motion, speed and velocity)
Permutation, combination and probability	Actuary, statics and estimation
Trigonometry	Architecture, engineering and measuring the length of objects on earth
Complex numbers	Alternating current and electricity
Logarithms	Radioactive decay, bacterial growth, determining age of fossils, seismology and Richter scale
Inductions and series	Generalization of the ideas in real life (behaviors, blood analysis, solving puzzles), population growth of animals and growth of animals (length of a snake)
Matrix, determinant and linear equations	Cryptography and computer systems
Functions	Piecewise functions (prices of a parking lot, grade intervals)
Differentiation	Finding area and volume of irregular shapes on earth

Source: Results of the real world connections examples suggested by the experts [8]

The intent of this study is to define gamification of education. Gamification directly effects engagement and motivation. Gamification also indirectly leads to acquiring more knowledge and skills. In addition to these, gamification encourages students to perform an action; for example, motivating students to practice computer programming will increase their skills and motivating students to memorize consistently can increase their knowledge.

Applying gamification strategies with technology to curriculums may often do a better job of teaching. However, it does not mean it should be a replacement for a comprehensive curriculum or face to face instruction.

4. Conclusion and Future Work

Gamification presents an opportunity to model and guide the enculturation process of computer science undergraduates. It also has the potential to make the matriculation journey more engaging for a broader range of students if done correctly. Understanding the current culture of CS and the readers department is critical to influencing change through gamification. This process, like any process that involves humans, needs to be adaptive and nondeterministic. What it means to be a computer scientist is subjective and the field of computer science is continuously changing. Werbach's iterative design framework offers a good reference point for seeking change through gamification. Meaningful gamification should focus on creating engagement loops that motivate users to perform desired activity and can be done without explicit integration of game components. An in depth understanding of motivation and fun highlights why some approaches to gamification are not as successful as the researchers would have expected. Both internal and external feedback on the game mechanics and dynamics used are essential to ensure that any gamification process is objective and truly holistic in the development of the student [9].

According to Zichermann and Cunningham; gamification is the implementation of game based thinking or game mechanics in order to engage users and solve problems [10]. Gamification in education can be a powerful strategy when implemented properly, as it can enhance an education program and achieve learning objectives by influencing the behavior of students. So that, gamification of the classroom can leads to increased student

engagement and success. The result of the study presented here in suggests gamification mechanics can provide an educational content for open minded students.

This is an ongoing project with increasing interest and involvement of educational experts. Further research will be conducted as proposed and scheduled. The final result of the study is expected to provide important evidence students and teachers. The optimum procedure for development of an integrated curriculum and the impact of deployed framework in quality of education. I suppose that instructors be able to integrate gamification strategies into course design to more effectively engage students.

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