Implementation of a Gamification Platform in a Master Degree (Master in Economics)

Implementación de una Plataforma de Gamificación en un Master (Master in Economics)

Fernández Zamora, Juan Carlos[a], Arias Aranda, Daniel[b]

[a] Fernández Zamora, Juan Carlos (Universidad de Granada, jcfz@correo.ugr.es), [b] Arias Aranda, Daniel (Universidad de Granada, darias@ugr.es)

Abstract

Nowadays, educational platforms focus on offering content as well as covering the main needs of users. However, very few or almost none offers anything to improve the integration between users and the system. It is intended to use the thinking of games and the mechanics of games to solve these problems and motivate users.

An experiment has been carried out for this reason, in which an educational platform, created in a personalized way for the students of the Master in Economics of the University of Granada, becomes the day to day of these students, yielding results and Statistics on how to improve student motivation.

Keywords: [learning; Gamification; motivation; games; case study];

Resumen

Hoy en día, las plataformas educativas se enfocan en ofrecer contenido así como en cubrir las primeras necesidades de los usuarios. Sin embargo, muy pocas o casi ninguna ofrece nada para mejorar la integración entre los usuarios y el sistema. Se pretende utilizar la lógica de los juegos y la mecánica de los juegos para resolver estos problemas y motivar a los usuarios.

Por esta razón, se ha llevado a cabo un experimento en el que, una plataforma educativa, creada de forma personalizada para los estudiantes del Master in Economics de la Universidad de Granada, se convierte en el día a día de estos estudiantes, arrojando resultados y estadísticas sobre cómo mejorar la motivación de los estudiantes.

Palabras clave: aprendizaje; Gamificación; motivación; juegos.

Introduction

The modern educational challenge involves tasks of engaging students, stimulating their interests, retaining their attention, and maintaining a positive attitude in educational environment. The clue to achieve this result is try to maintain a fruitful communications environment that encourages feedback and reinforcement, not only between the professors and students, but also among the students themselves. Usually students perceive learning process as hard working procedure, e.g. stay active during the classes, stress during the exams etc., but implementing socially interactive mechanisms, with the proper level of control for encouragement and discipline, can bring learning process to fun and produce more effective educational environments. Hence, the main aim of this gamification project is to improve motivation, learning experience, participation and proactivity of the students in a Master programme by implementing gamification in study process. The project is designed in English as an official Master in Economics is completely taught in English and forms 60-70% of non-Spanish students.

We have improved a unique design for the project to be implemented in Master programme of Economics which involves as well different courses in operations management and supply chain management at the University of Granada exploiting gamification strategy, including story line, experience points, leveling, leaderboards, rewards and achievements. The expected results of the project are to increase students' motivation and engagement, active participation in study process, obtaining sense of flow of studying and self-education using MOOCs.

Today digitized life creates, in many cases, different distractions for students that can cause lack of time management and provoke poor academic performance. Implementing gamification will benefit from this disadvantage; by focusing student attention to immerse students and engage them into the study process.

Today gamification has already become a popular tactic at some educational institutions to encourage specific behaviors while the results of case studies in researching of gamification in education showed a positive affection on students´ behavior. Gamification is commonly known as the use of game thinking and game design elements in non-game contexts to engage users in solving problems and increase users' self-contributions. Nick Pelling in 2002 was the first who coined the term "Gamification" (Deterding, 2011), but it gained the popularity only in 2010, when several industrial players and international conferences started the campaign of its widespread adoption.

Nowadays, gamification has already been implemented in education, business (R. O'Connor; 2011), training, social networking, marketing (Djundubaev, R., 2013), health and wellness. For example, kindergartens and primary schools have adopted gamification in the classes; Facebook serves as online platform for campaigns of companies, which implemented gamified applications to increase program participation of their products by building up communities; Nike in conjunction with Apple provided a gamified service to motivate people to run; business companies implemented gamification to improve experiences of their employees (Zoë Epstein, 2012).

Background

Lately the designer of videogames, Jane McGonigal combined definitions of game and offered four traits that games include: goal, rules, feedback system and voluntary participation. The goal is the specific outcome of the players that has to be achieved by following the rules (limitations of goal achieving process) (Nathan Baddoo, 2011) which unleash creativity of the player and foster strategic thinking. The feedback system is performed as a form of points, levels, score, or a progress bar which provides infor-

mation in real time to the player how close s(he) is about to achieve the goal. Voluntary participation claims that goals, rules, and feedback are consciously accepted by the player. Thus, gaming and games in counter of playing and toys, characterized by rule systems and the competition of players towards outcomes. So far, as video games are designed to entertain and motivate users of their retention, game elements could make enjoyable and engaging other non-game products and services.

Game design elements are acting as tools in the creation of gamification scenarios and can be divided into three categories in a form of pyramid: dynamics, mechanics and components that are connected in decreasing order where each mechanic is tied up with one or several dynamics and each component is tied with one or several mechanics or dynamics. One of the most important components of gamification with the highest level of abstraction is Dynamics. Mechanics are at the basic level of the gamification process and Components are specific forms of elements, which emerge from the mechanics or dynamics. For instance, Points (components) give the player rewards (mechanics) and create a sense of progression (dynamics).

We have to denote that Gamification is not only to take out game elements from videogame and implement them into non-game context. A good game design involves thinking about problems in a certain way. For example, several innovative car companies as Nissan, Ford, and Toyota gamified driving experience to promote new electric car that foster influence on the behavior of drivers by making them drive more efficiently affecting in both in an environmental and a material way.

Prensky believes that Digital Generation can think faster and be multitask exactly because of practicing in computer games and using mobiles and other gadgets. For this generation it is not just about be active online, connecting to social network services or using Information Technology (IT) in general, but commonly be engaged to all of these activities via games.

Videogames cover all demographic ages, starting from children and teenagers, continuing with average player of 37 years and comprising with more the 50 years old players. To categorize the users who play video games Richard Bartle introduced a theory of different types of players by studying Multi User Dungeon text-based game. He differentiated players by four aspects that people usually like while playing video games.

(1) The achievement within the game concept, when players set in-game goals for themselves and do everything possible to achieve them.

(2) Explore the game, when players try to learn as much as possible about the landscape.

(3) Socialization with other players, when players use communication tools for role-play games through communication with other players.

(4) Imposition upon others, when players use the features of the game in order to cause distress or, in few cases, to help other players.

According to four identified factors all these players can be divided by Achievers, Explorers, Killers and Socializers. Bartle's model will be implemented in a study process. Achievers learn systematically, the want to be recognized. For this type, following game mechanics can be used: levels, hierarchies, ranks, badges, rewards, progression, information, etc. Explorers learn on their own, they like to discover and freedom to fail. Game mechanics: discovering, ownership, random acts of kindness, etc. Killers can learn as individually as in groups by acting. Clearness, challenges and competition is very important for them. All they want to be a leader. Game mechanics would be points, ranks, collaboration, competition, points,

badges, etc. (Niklas Schrape; 2013). Socializers learn in groups by collaboration. They need other people to network. They like to form ideas and need to be admired. Social standing is considerable for them. Collaboration, share, trade, random of acts of kindness, gifts and charity are game mechanics that could be applied for this type of players. Summarizing, Bartle's approach is a basic understanding for students' motivation and can be useful for designing gamification.

Gamification strategy can be either successful or ineffective. It is impossible to make students do something they do not want to do, just by giving them points and rewards. Good gamification scenario requires an understanding of motivation. Generally, there are two types of motivation: extrinsic and intrinsic. External, tangible rewards lead to extrinsic motivation. For example, a person is seeking for any job, interesting only on the amount of money he/she will receive. Intrinsic motivation, on the contrary, drives behaviors that result to internal rewards, as happiness and positive feelings. For instance, a person is seeking for a job he/she enjoys, material issues go by the wayside. In our case, student can be highly motivated at studying because he/she really enjoys the process of education (intrinsic motivation) or he/she can be interested just in good marks (extrinsic motivation). In the project we propose to link extrinsic and intrinsic motivations together, hence gamification strategy can bring positive results (Jitendra Maan, 2013).

Andrzej Marczewski adopted four key motivational drivers that foster good gamification scenarios: relatedness (willingness to social status, connections, belonging), autonomy (willingness to creativity, choice, freedom, responsibility), mastery (willingness to learning, personal development, levels) and purpose (willingness to altruism, meaning, a reason why). In general, those who are energized and feel active until the end can be characterized as motivated, while those, who are out of inspiration are considered as unmotivated (Nathan Baddoo, 2001).

Implementing right gamification scenario, can lead to a state of flow. Csikszentmihalyi claimed that "flow" is a state of mental condition in which a person is fully integrated into what he/she does. Csikszentmihalyi proposed seven core components of flow and divided them into two categories (Table 1): conditions and characteristics, where conditions must be achieved before flow is reached; characteristics appear while a person is in flow, even if they are not aware of it.

Conditions of Flow	Explanation
Clear tasks	Person understands what they must complete
Feedback	Person receives clear and immediate feedback showing what succeeds and what fails
Concentration/focus	Person is not distracted and can fully attend to the task
An attainable, balanced goal	Goal is challenging and within their abilities to complete

Characteristics of Flow	Explanation
Control	Person believes their actions have direct impact on tasks and that they can control the outcome
Diminished awareness of self	Complete focus on the task leaves little room for feeling self-conscious or doubt. Often described as becoming a part of the activity.
Altered sense of time	Perception of time is distorted. Seconds can feel like minutes, minutes like hours. Yet, time also passes by quickly, unnoticed.

In gamification values like motivation, participation, engagement, fun, and behavior provide improved productivity and retention. For instance, "Coursera" an educational company in cooperation with leading universities teaches online courses from Sciences and Engineering to Humanities and Business. All assignments and online tests are measured the progress with machine evaluating system and students receive immediately feedback by providing the results with implemented rewards system like badges, rankings, levelling up, etc. In addition, students are able to interact with each other during the courses that encourage them to be more engaged and make them assist different discussions in the long term, which also provides feedback where students are able to realize how good they understand material. Today over two millions students enrolled in 200 different courses.

Objectives:

a) To explore how gamification impacts on creation of value, distinguishing between additional, complementary, comprehensive, and distribution services respectively.

b) To examine in depth the relationship between the process of studying and gamified mechanisms, determining their actual ability to generate value.

c) To determine the importance of applying gamification for Master in Economics program to configurate the effectiveness and development of new service.

d) To study how innovations can change students' behavior.

e) To analyze in depth the relationship between the adoption and implementation of gamified approach as an important addition to study process.

What makes people change their behavior? According to Fogg's Behavior Model (FBM), there are three factors of FBM which should coinside at the same time in order to occur the behavior change: motivation, ability and trigger. Motivation has three core motivators: pleasure/pain, hope/fear, acceptance/rejection. Ability is driven by six simplicity factors: time, money, physical effort, brain cycles, social deviance and non-routing. Spark, facilitator and signal are behavior triggers. For instance, Speed Camera Lottery in Sweden. The idea was to monitor speed-obeying drivers and reward them participating in a lottery. The money of the fines of the drivers who did not obey the speed limit were collected to form the prize of the

lottery. This gamified experiment lasted during three days in a multi-lane street and resulted with average speed dropped from 32 km per hour to 25 km per hour. All three FBM factors were presented in Speed Camera Lottery: trigger as a lottery sign on camera fixture, ability as decreasing vehicle speed and motivation as a possibility win a lottery.

To achieve all assigned objectives we will use FBM by implementing gamification in conjunction with persuasive technologies to the programme of Master in Economics. It will include a story line, experience points, leveling, leader boards, rewards and achievements. The story line represents a virtual company with management hierarchy chart (Table2). During the academic year students obtain points by completing different gamified tasks that foster promotion, starting as employee up to chairman of company. To be promoted for a higher position students have to reach special amount of experienced points. The higher position costs the higher amount of experience points. Once student becomes a manager, s(he) can choose among five types of manager s(he) wants to be, whether operation, financial, marketing, accounting or HR manager, according to their topic of final Master Thesis.

Table 2.
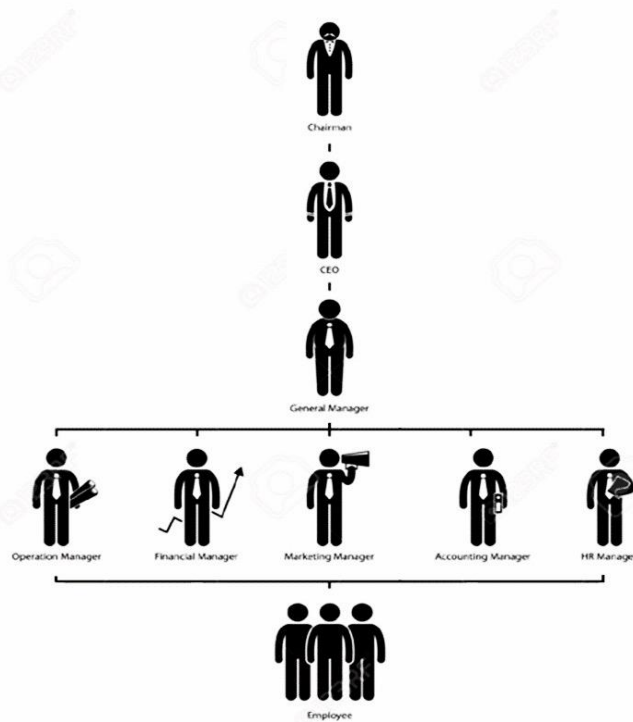
Mobile applications for Android and iOS platforms will be implemented to the Master programme. For instance, class and seminar check-inns. Every check-inn will be rewarded with points. Online platform as a website also will be implemented and connected to mobile applications. In this way, students and professors will be connected to each other any time. Collaboration with the teaching stuff and/or among the students will facilitate obtaining more points to reach the highest position of the company. Furthermore, "Wikinomics" which is equivalent to Wikipedia will be applied to the Master programme. We are devel-

oping a free, open content online encyclopedia for economists that will be created through the collaborative effort of a community of users. Every registered student in UGR Master in Economics can create an article for publication in Wikinomics. Professors as well as students will be able to edit articles under the supervision of coordinator of the project.

Depending on the other project, two elective massive online courses are going to be developed for those students, who want to obtain more points. These and other gamified tools will complement the Master programme. Once a year upon completion of the gamification project a special event so-called "GamiDay" will be organized for those students who achieve top hierarchy position. They will be material rewarded and presented to several real top invited CEOs of Granada.

Methodology

Qualitative and quantitative techniques will be used as methodology. In this case, complement the quantitative in the sense of explaining the reasons behind certain behavior of the variables. Its character is interpretive, is based on the case study and grounded theory (Juho Hamari, 2014), and the main techniques used are questionnaires, participant observation and document analysis (Mora, A. 2015). In this case, the software package to be used is the Nvivo10.

Regarding quantitative techniques, will proceed to the use of multivariate techniques, considering if dependency relationships or dependencies between variables (Van Roy, 2015). The software used to perform quantitative techniques consists of three software packages, SPSS 20.0, MPlus EQS 6.2 and 7.0. The results will be contrasted with those of the same area that have been published by universities and research centers in competitive journals.

Implementing Gamification into the Master in Economics programme will help to provide students with advanced professional training in analytical and research skills to achieve excellence in Economics, Econometrics and Business Management. This kind of Master degree serves the professional needs for advanced knowledge of practitioners of Business Management and Economics.

Specifically the Gamification that will be provided in the field of Master in Economics, will intend to motivate students to follow specific responsibilities:

Name	Frequency	Points
Class attendance	Every course	5p
Class participation	Once a week / course	20p
Seminars	Once a week	50p
Wikinomics	Once a week	100p
Assist in research projects	One per trimester	0-500p
Presentation or Debate	One per trimester	0-250p
Exams	Every trimester	0-1000p
Business simulation	One per year	0-1500p
Internship	One per year	0-450p (Bonus)

The general structure for gamification to motivate students in specific responsibilities is developed as follows:

Core responsibilities	Enhancive respon-sibilities	Gamification pro-vider	Gamification tools
Class attendance	Check-inns	Android and iOS apps connected to online platform	Points + leveling + leaderboards
Class participation	Acquire bibliograph-ic information about the current state of the economic litera-ture and business research	Online platform. Direct Interaction between professors and students	Points + leveling + leaderboards
Seminars	Check-inns and critical review	Android and iOS apps connected to online platform	Points + leveling+ leaderboards
Wikinomics	Formulate and an-swer questions such strategies applicable to business	Online platform	Points + leveling+ leaderboards
Assist in research projects	Develop scientific articles	Online platform. Direct Interaction between professors and students	Points + leveling+ leaderboards
Presentation or Debate	Understand the theories, relevant existing trends and debates	Online platform. Direct Interaction between supervisor and students	Points + leveling+ leaderboards
Exams	Explore the theories and obtained knowledge	Direct Interaction between professors and students	Points + leveling+ leaderboards
Business simulation	Apply and extend existing theories to solve real problems	Online platform.	Points + leveling+ leaderboards
Internship	Solving technical and practical prob-lems related to real work organization and analysis of data	Online platform. Direct interaction between firms and supervisor	Points + leveling+ leaderboards

Results

Over the last decade, many professors found out that young generation gain skills and a method to learn from video/computer games. An opportunity to study in a manner of game will foster students' motivation and retention of study process. To emulate the game we will provide a story line for everyday learning process using game components, mechanics and dynamics such as:

- EXPERIENCE POINTS, LEVELS, LEADERBOARDS, TEAMS - components

- REWARDS, FEEDBACK, COMPETITION, COOPERATION, CHALLENGIES - mechanics

- PROGRASSION, EMOTIONS, NARRATIVE, RELATIONSHIPS - dynamics

Implementation of gamification to study process should significantly improve motivation, learning experience, participation and proactivity of students. Completing tasks students whether alone or within the group will receive points to be promoted to a higher position of the virtual company. The whole process will be digitized and connected among coordinator of gamification project, professors and students.

	% Ocurrency	% Point
Diarly reward	52	2
Reward for obligatory assistance	18	34
Reward for voluntary assistance	9	26,5
Reward for obligatory task	16	30
Reward for voluntary task	5	7,5

Today digitizing and internet of things are two trend topics and gamification precisely fits to both, especially in learning environments. It has already become a part of several well-known universities, which successfully gamified many online courses. To keep up with the time we have to modernize education and make it more attractive to students.

In 2011-2012, we have already tested gamification in public high schools in the province of Granada by implementing business simulation. The effect of participating in business simulation experience showed that dimensions of achievement, innovation in business and perceived self-esteem are all positively influenced by gamification. This time we a going to gamify not only one course, but also entire UGR Master in Economics program.

We have realized to maintain the whole gamification project manually is impossible. That is why we are digitizing it by developing two applications for Android and iOS platforms. Also instead of Facebook as online platform, we are developing our personal webpage, which will be connected to mobile applications by the end of the project according to the objectives we announced.

Conclusions

Analyzing the best way to configure the process of implementation of gamification to the study process to maximize the added value even though after digitizing it, still can be argued that educational institutions would be interested in the results of this project. Our study model, implementation of contemporary technologies in the study process at educational institutions is one of the most important foregrounds at present moment thereby affecting the efficiency of internal and external processes, facilitating the ability to motivate students, improve learning experience, participation and proactivity.

The obtained results through methodology and different research techniques will be collected in the form of scientific articles in journals of impact in the area of education and also will be spread to the directors of the different programs at UGR in case they would like to implement gamification as well.

In case of a positive feedback from students we will propose to UGR IT teams to cooperate in maintaining of our own online gamified platform. Also mutually with professors we are developing two Massive Open Online Courses in UGR Master in Economics programme. If the results of the project would be positive, we will organize the presentation for every department of UGR who is interested in educational innovations.

References

Deterding, S., Dixon, D., Khaled, R., & Nacke, L. (2011, September). From game design elements to gamefulness: defining gamification. In Proceedings of the 15th International Academic Mind-Trek Conference: Envisioning Future Media Environments (pp. 9-15). ACM.

Djundubaev, R.; Opazo-Basaez, M.; Arias-Aranda, D. (2013): "Gamification from a Service marketing Perspective", International Conference on Business Servitization", Granada.

S. Basri, R. O'Connor; (2011). The Impact of Software Development Team Dynamics on the Knowledge Management Process; 23rd International Conference on Software Engineering and Knowledge Engineering, USA, July 2011.

Nathan Baddoo, Tracy Hall; (2001) De-motivators for software process improvement: an analysis of practitioners views; The Journal of Systems and Software 66 (2003) 23–33.

Juho Hamari, Jonna Koivisto, Harri Sarsam; (2014) Does Gamification Work? — A Literature Review of Empirical Studies on Gamification; 47th Hawaii International Conference on System Science.

Mora, A., Riera, D., Gonzalez, C., Arnedo-Moreno, J.: 'A Literature Review of Gamification Design Frameworks'; In 2015 7th International Conference on Games and Virtual Worlds for Serious Applications (VS-Games). IEEE (2015), pp. 1–8.

Zoë Epstein; (2012) Enterprise Gamification for Employee Engagement, Ithaca College.

Van Roy, R., Zaman, B.: 'Moving Beyond the Effectiveness of Gamification'; In Gamification Workshop, CHI (2015).

Niklas Schrape; (2013) Gamification as Simulatization of the Real; Leuphana University 15-17th May 2013

Jitendra Maan; (2013) Social Business Transformation through Gamification; International Journal of Managing Information Technology, Vol.5, No.3, August 2013.