

GAMIFICATION IN ACCOUNTING DISTANCE EDUCATION

Jennifer L. Gómez, Liliana D. Monroy

Public Accounting Distance Program, Military University Nueva Granada, Colombia

Abstract

The aim of this paper is to analyze the skills of the Public Accountant in accordance with that established by the International Federation of Accountants- IFAC, its relationship with multiple intelligences and different didactic strategies, specifically gamification applied to undergraduate students of Public Accounting Distance Program at Military University of Nueva Granada in Colombia. An exploratory qualitative methodology was used, for which the students who studied the courses of Accounting II, Public Accounting, Finance and Public Budgets in the second semester of 2017 were interviewed. As a result, it is observed that most of the respondents valued positively the application of gamification strategy in Moodle platform and especially the use of the Kahoot tool. The data provided in this study indicate the need to apply didactic strategies and activities that promote the multiple intelligences and motivate the student to construct arguments in decision making at managerial level.

Keywords: Multiple Intelligences, Didactic Strategy, Gamification, Accounting Distance Education

1. INTRODUCTION

In the last years it has increased the number of innovative activities making use of Moodle in the Public Accounting Distance Program of Military University Nueva Granada (UMNG, by its initials in Spanish), the most important strategy that has been applied is gamification with which has encouraged students of the public accounting to develop skills aligned to the multiple intelligences of Gardner (1983), this have led to the students: to appropriate knowledge, solve cases, perform statistical analysis, and carry out decision-making; key aspects in accounting career in Colombia.

To achieve the implementation of gamification using Moodle, the coherence between the public accountant abilities, multiple intelligences and didactic strategies to stimulate these intelligences was analyzed in the first place. Secondly, the difference between the concept of game and gamification was examined, as well as the description of different types of players, who are involved in the learning according to the guides and contents. This study shows that gamification offers alternatives motivating both teachers and students, using Information and Communication Technologies (ICT), where Kahoot application is highlighted because it allows: to put into practice the knowledge learned, provide feedback and evaluate immediately.

Finally, it's performed an analytical description of implementation results of the gamification didactic strategy applied to the students who took the courses of: a) Accounting II, b) Public Accounting, c) Finance and public budgets, attended in the second semester of 2017.

1.1. Skills, multiple intelligences and didactic strategies

According to the International Federation of Accountants (IFAC), an integral public accountant must align himself to the skills proposed in the International Education Standard no. 3 (IES 3), these skills are: 1) intellectual, 2) technical and functional, 3) personal, 4) interpersonal and communication, and 5) organizational and business management (IFAC 2008). These skills allow the accountant professional to develop the ability to solve business problems and make appropriate decisions.

Those skills can be compared with Gardner's multiple intelligences (Gardner 1983), which are: interpersonal, intrapersonal, logical-mathematical, linguistic, spatial, musical, kinesthetic-corporal and naturalistic. In considering of Ander's contributions, Digital intelligence is added too (Ander 2006), this ability related with managing new technologies is considered essential in distance education. The Table 1 shows the relationship between public accountant skills and multiple intelligences.

In order to develop properly the skills indicated in IES 3, the six (6) multiple intelligences related in this table must be strengthened considering the proposals of Gardner (1983) and Ander (2006). So, each skill is related to the multiple intelligence (s) in front of it, for example, the development of intellectual abilities requires encouraging linguistic, spatial and digital intelligences; the development of technical and functional skills requires the incentive of mathematical intelligence; and so on.	
Public accountant skills according to IES 3	Multiple intelligences
Intellectuals	Linguistics, spatial, digital
Technical and functional	Math
Personal	Interpersonal
Interpersonal and communication	Intrapersonal
Organizational and business management	Linguistic, spatial, digital, logical, mathematical, interpersonal and intrapersonal

Table. 1. Public accountant skills and multiple intelligences.

Source: Own elaboration based on IFAC (2008), Ander (2006) and Gardner (1983).

So that, by enhancing mathematical intelligence (ability to develop calculations, use numbers effectively and reason properly) the public accountant will be able to perform: mathematical abstractions, logical explanations, mathematical and statistics applications, decision models, risk analysis, and measurements and assessments of economic reality at micro and macro level.

Developing linguistic intelligence (arranging words effectively, either orally or writing) requires encouragement of reading, critical analysis and analytical thinking, which will allow that the accounting professional carries out : a) adequate reporting, b) an appropriate fulfillment of legal and regulatory requirements, and c) comprehension, application, analysis, synthesis and evaluation processes, all this in favor of the resolution of communicative problems and argumentation in the taking of decisions at the organizational level.

Regarding spatial intelligence in public accounting education, it is important the ability to depict visual or spatial ideas in a graphical way to analyze and communicate effectively the organizational information.

Concerning digital intelligence, it is essential to promote computer skills, in the professional field, because a public accountant will have to do: calculations in Excel, presentations in PowerPoint or Prezi, calculations in statistical and econometric tools such as SPSS or Stata, and to use ERP software such as SAP and Oracle for the administration of human, financial-accounting, production and logistics resources.

Potentializing the inter and intrapersonal intelligences will develop the personal, interpersonal and communication skills in public accountants as indicated in IES 3, this will allow that the human being recognizes himself and understands his intellectual and emotional processes, which favors the development of the ability to create empathy and work in a team.

On the other hand, Gamboa, García & Beltrán (2013, pp.97-124), indicate the didactic strategies or activities that could promote the multiple intelligences mentioned in Table 1:

- a) Logical-mathematical intelligence: it can be fostered through application of modeling, magazine club, problem solving, riddles, comparison and contrast, problem-based learning, deduction and induction.

- b) Linguistic intelligence: it can be promoted through development of debates, round tables, questions, exhibitions, readings, description, review, summary and narration.
- c) Spatial intelligence: it is encouraged through elaboration of ideograms, mind facts, conceptual maps, flow diagrams, drawings and games.
- d) Digital intelligence is promoted using forums, chats, performances in virtual worlds and web tools.
- e) Interpersonal and intrapersonal intelligence can be promoted through teamwork activities, role playing and reflection.

However, to improve motivation, creation of practical scenarios and encourage collaborative work, several of the strategies mentioned above were incorporated in Moodle activities by means of gamification. Before to show the analysis of application results of this strategy, the next chapter establishes the differences between game and gamification concepts and characterize what is meant by gamification in this document.

2. GAME AND GAMIFICATION DIFFERENCES

For establishing the differences between game and gamification, this paper reviews the concepts of the Royal Academy of Spanish Language (RAE, by its initials in Spanish), as well as authors' perspectives who identify characteristics and similarities between both concepts.

2.1. What is a game?

The RAE defines a game as a recreational exercise that is subject to rules in which it is won or lost. For example, playing ball, chess, cards, billiards, among others. McGonigal (2011, quoted by Teixes 2014) indicates that the characteristics of the game are: objectives, rules, feedback and voluntary participation. An objective in game context is the result that players want to achieve with their participation in the game, which will determine their success or failure. Rules refer to limitations of a game, which will promote creative abilities and strategic thinking. Elements such as interactivity, graphics, stories, rewards and competitions are not fundamental in a game, with or without these can exist a game.

A game incorporates five (5) freedom axes: a) freedom to fail (explore-do / test-error), b) freedom to experiment (new forms of use), c) freedom to adapt identities (different interaction roles) d) freedom to effort (relaxed, accelerated), e) freedom to interpretation (intrinsic motivation) (Teixes 2014). Then, gamification concept will be reviewed from several authors in order to appropriate it and differentiate it from game term.

2.2. Gamification

The most important reference about gamification is Kapp (2012, p.125) who defines it as “the use of game-based mechanics, aesthetics, and game thinking to engage people, motivate action, promote learning, and solve problems”. In table 2 are showed another concepts about gamification:

Author	Gamification definitions
Werbach and Hunter (2012)	The use of game mechanisms in contexts unrelated to the game to encourage desired behaviors
Simões et al. (2013)	The use of game mechanics and dynamics in non-gaming applications
Van den Boer (2013)	The use of game elements and game thinking in a context unrelated to the game to increase the people commitment
Dale (2014)	It is much more than rewards, it is about understanding and influencing human behavior
Hamari et al. (2014)	An approach focused on the possibilities of motivation and change in behavior as a result

Sánchez (2015)	A technical and artistic process that consists in reproducing objects, idealizing characters and environments, whose purpose is to create a visual environment where to play
Folmar (2015)	The use of game thinking and game mechanics to fulfill non-game purposes
Craven (2015)	An immersive experience that creates commitment for the user
Leaning (2015)	An experience outside the context of the game
Kavaliova et al. (2016)	The use of game elements and design techniques in an environment unrelated to the game, often with the aim of influencing the behavior of users
Ahmed and Sutton (2017)	The process of integrating the theory and design of the games, the elements of the game, the aesthetics of the game and the mechanics of the game into a learning experience
Casandra (2017)	A process to rethink a real-life goal to be more attractive and achievable
Zichermann and Cunningham (2011)	In business, it refers to the process of thinking about the game and the mechanics of the game to involve users and solve problems
M2 Research (2012)	A business practice that is at the intersection between marketing, games and psychology, to create attractive and exciting user experiences that involve the client or user
Gallego and De Pablos (2013)	A practice that facilitates a participatory culture based on the innovation of internal and external agents
Contreras (2016)	The use of game design elements and principles to be used in non-gaming contexts

Table 2. Gamification definitions

Source: Own elaboration

The gamification main elements are: a) fun or motivation, and b) types of players. Lazzaro (2004, quoted by Teixes 2014), indicates that one of the most important gamification elements is the fun and it's classified into four factors: 1. The hard fun (players motivation to face challenges, obstacles and objectives), 2. The simple fun (by means of exploration of the game, the context and the possibilities), 3. The serious fun (combination of emotions through perception, behavior and thinking of player), and 4. The people fun (interaction and competition between players).

Regarding players types, it's necessary to know the motivation type and interest of players group, in the case of this research: undergraduate students of the UMNG's Public Accounting Distance Program. Respect players type, Bartle's and Marczewski's proposal were analyzed. Bartle (1996, pp.4-7) exposed four (4) players types according to the motivation, performance and interaction within proposed scenario. For Bartle, players are classified in: achiever, scout, socializer and competitor. While Marczewski (2015) proposes six (6) players types: player, philanthropist, socializer, achiever, free spirit and disruptor.

All players have different motivations, according to Marczewski (2015, pp.165-177) players are attracted to points and rankings. Philanthropists like collecting, exchanging and giving away. Socializers like partnering in teams for a common purpose in a friendly way. The achievers are motivated by the challenge and differentiating themselves in the searches or levels. The free spirits like exploration and the possibility of changing or adapting characters-avatars, spaces and scenarios. The disrupters are interested in innovating and proposing.

Taking into account the existence of different types of players and learning objectives, teachers or tutors in distance education must perform a gamification design, because to plan activities is not an improvised dynamic. The activities should have an objective that makes sense, maintaining the motivation of the participant, in this case the student, to give a solution - making the right decision of the case raised.

Marczewski (2015, pp.165-177) proposes a formal framework with two important aspects: the problem definition and the design and construction of the solution. The problem definition includes the objectives with which students are motivated and in it is exposed challenges, rewards, medals and ranking that will be obtained in each level. On the other hand, design and construction of the solution establishes the path to be taken by the participant-student and influence: the behaviors (actions) into the system, the motivations (and player typologies) that will be promoted, and the mechanics that are going to be used. A feedback is an appropriate tool to maintain the motivation of the student, because the feedback changes the status of the participant, thus it is important to recognize that activities carried out by the student make sense and contribute in his intellectual development (Marczewski 2015). Gamification, therefore, is a process that requires the establishment of frameworks, guidelines and characteristics to achieve success in its implementation.

As a conclusion of this section, the game differs from the gamification in: a) the planning, b) the skills that will be developed, and c) the compensation for the activities carried out; which generate new knowledge and allow adding value in learning process in order that the future Public Accountant resolves properly the issues and the cases that are present in class and working life.

2.3. Activities developed in gamification strategy applied at UMNG

Gamification didactic strategy was linked in the following courses: a) Accounting II, b) Public Budgets and Finance, and c) Public Accounting, during the second semester of 2017 in the Public Accounting Distance Program at UMNG.

In the development of the strategy of gamification, to motivate the students, several activities were carried out incorporating aspects of Marczewski's proposal: a) Points: Giving points when students do the activity, so the participant (student) feels rewarded for his effort. b) Ranking table, it classifies and shows the success of the participants in a challenge. c) Achievements, badges and medals: benefits that are achieved by performing a series of specific actions within the challenges or levels developed. d) Challenges: exposure of several challenges with specific dates, the participant or user feels the need to participate allied with others and contribute to the cause.

The gamification strategy integrates activities like: Prezi, infographics, kahoot, among other, and it was incorporated the following elements and characteristics of gamification: 1) Creation of an experience or storytelling, stories were created and their scenario was the business world, a pixton comics were done in order to transmit information and knowledge to the students about finances and accounting topics and at the end of each story it were proposed some challenges, in which the students must collaborate in the resolution of the mission, thus involving students and teachers as characters in the storytelling, 2) design of challenges, 3) collaborative work within the groups, 4) Rewards by awarding medals, trophies and points, and 5) establishment of an individual and inter-group competition procedure accompanied by the use of ranking tables.

In online tutorial videoconferences, the Kahoot application was applied in the following way; of the six (6) video conferences scheduled in the semester for each course, in three (3) sessions kahoot was used as support for the session. The implementation of Kahoot in each session was done considering the three (3) pillars on which this application is based, which are: 1) Create: a fun learning game in a matter of minutes (which it calls "kahoots"), through a series of multiple choice questions. 2) Play: a game in a group environment. 3) Learning in a group and in a network environment that promotes discussion and pedagogical impact (Caraballo, Peinado & González 2017). For this, questionnaires of multiple selection questions were elaborated based on the readings assigned to address the topics established in the programmatic content for each week.

The questionnaire of each session was shown by the professor on the shared screen in Black Board Collaborate during the online tutorial videoconference and the students answered each question in real

time, at the end of the session the three (3) students with the best scores in each kahoot obtained awards by assigning to them additional points on the total score over the final rating, which encouraged: a) the participation of students, b) prior reading of the material, and c) better performance in the analysis and answer of the questions. Which strengthened the knowledge and learning of the participants by means of use of their own mobile devices with kahoot.

3. ANALYSIS OF RESULTS IN THE APPLICATION OF THE GAMIFICATION STRATEGY

Each collaborative work team of three (3) students had to send a deliverable as evidence of the activity: Prezi, video, infographic, among others, according to the parameters established for each mission to comply with the challenges.

For example, in the subject Accounting II, the professor prepared a storytelling about financial and accounting topic to the students in the Pixton tool, this storytelling shows how the company Eureka Ltd. informs the members of the financial committee that the organizations with which it has commercial links are immersed in serious financial scandals, which can directly affect the finances and reputation of the company, and the students were assigned with the role of members of the financial committee of Eureka Ltd., for that reason they must evaluate the current financial situation of the organization and advise the professor, who has the role of company president, about measures that must implemented for the purpose of solving those problems.

Respect to the challenges, for example in one of them, the participants must solve the following questions from the theoretical content in a PowToon video and send it to professor: What is accounting? and How does this field affect all the other activities of Eureka Ltd.? This same dynamic was followed in the other challenges and courses, adjusting the storytelling and the required deliverable (Prezi, video, infographic, etc.) depending on the type of item to be evaluated (theoretical and / or practical).

In order to assess the perception of the students of the Public Accounting Distance Program, a survey was developed at the end of each course. Regarding the percentage of student participation compared to the number of students enrolled in the courses where the "gamification" strategy was applied, it's evident that of 76 students enrolled in Moodle platform, 64 answered the survey, which indicates that 84 % of students answered the survey.

Table 3 shows the survey results in the first question about: "rate from 1 to 5 the level of understanding obtained by you in each of the subject areas when you made and experienced each one of the following activities: infographics, Prezi, videos and Kahoot ".

Questions	Infographics	Prezi	Videos	Kahoot	Participation Percentage
Blank answer	1	2	1	3	3%
Didn't understand	0	1	1	1	1%
Low level of understanding	2	0	0	2	2%
Regular level of understanding	3	6	4	8	8%
Good level of understanding	19	18	19	20	30%
Excellent level of understanding	39	37	39	30	57%
Total students surveyed					64

Table 3. Perceptual results of activities applied

Source: Own elaboration

Analyzing this information, it is evident that the students consider in positive way the use of activities like Prezi, videos, among other, because it contributes to improve the learning and comprehension processes. 57% of all responses mentioned that the students obtain an excellent level of understanding, followed by 30% in which they indicate a good level of understanding. The other answers show that less than 10% of the students consider that these activities promote a low level of comprehension.

In the second question about “How do you evaluate the use of Kahoot to motivate the participation of students in online tutorial video conferences?”, the students consider that kahoot: a) is an excellent and good tool, which promote socialization and active integration, b) encourages the student to be more attentive in the topics developed in the courses, c) contributes to improve their performance because they are motivated to obtain a better position in the standings, d) helps to unfold public speaking because they must report orally in the video conference to the professor, in real time, the reason for the selected response to validate their answer, e) increases the interest in the reading and appropriation of the subject, f) serves as an evaluation mechanism, and g) is a fun and interactive tool that helps make appropriate decisions.

4. CONCLUSIONS

The aim of gamification is to influence student behavior by using elements of game design, stimulating responsibility, commitment, motivation and teamwork, strengthening knowledge, which has a positive effect on the resolution of problems.

As conclusions of this research, it was evidenced that the enrolled students in the courses where the gamification strategy was applied, improved aspects such as: understanding level, individual and group participation, as well as interaction with information and communication technologies (ICT) due to the elaboration of videos, infographics, Prezi and Kahoot use.

The gamification in future works can be applied using other types of activities that can promote multiple intelligences such as problem-based learning in conjunction with actions in virtual realities.

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