

Gamification in distance education: experiences in a university educational model

Gamificación en la educación a distancia: experiencias en un modelo educativo universitario

<http://dx.doi.org/10.18381/Ap.v12n2.1849>

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ABSTRACT

Keywords

Educational model;
educational strategy;
distance education;
higher education;
gamification

The present article is the result of an investigation to verify if the gamification strategies in a distance learning course at the Autonomous University of Yucatan (UADY) are considered as innovative educational practices, according to the elements of its educational model and to verify the relevance of these strategies through the students' perception. The course was developed through an instructional design model using three basic gamification strategies (storytelling, escape room and "PBL"). Students' reflective journals were used to assess these strategies, as well as their comments in the discussion forums. It was found that the characteristics of UADY's educational model allow the development of innovative strategies such as gamification and on the other hand, students reported having experiences such as new ways of learning and developing behaviors such as motivation and teamwork. These findings are consistent with the literature and generate positive perspectives for the development of gamification in distance education at the university level.

RESUMEN

Palabras clave

Educación a distancia;
educación superior;
estrategia educativa;
gamificación; modelo
educativo

El presente artículo es el resultado de una investigación para comprobar si las estrategias de gamificación en un curso a distancia en la Universidad Autónoma de Yucatán (UADY) son consideradas como prácticas educativas innovadoras, de acuerdo con los elementos de su modelo educativo y comprobar la pertinencia de estas estrategias mediante la percepción de los estudiantes. El curso fue elaborado a través de un modelo de diseño instruccional utilizando tres estrategias básicas de gamificación (narrativa, cuarto de escape y "tríada PET"). Para valorar estas estrategias fueron utilizados los diarios reflexivos de los estudiantes, así como sus comentarios en los foros de discusión. Se encontró que las características del modelo educativo de la UADY permiten desarrollar estrategias innovadoras como la gamificación; por otro lado, los estudiantes manifestaron tener experiencias como nuevas formas de aprendizaje y el desarrollo de comportamientos como la motivación y el trabajo en equipo. Estos hallazgos son consistentes con la literatura y generan perspectivas positivas para el desarrollo de la gamificación en la educación a distancia en el nivel universitario.

Received: October 3, 2019
Accepted: April 1, 2020
Online Published:
September 29, 2020

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INTRODUCTION

Nowadays educational systems are constantly evolving, mainly due to labor market demands, emerging paradigms, social transformations and habits developed by information and communication technologies (ICT), just to mention some of the phenomena associated with no precedent on what is currently taking place. This is making educational institutions embark “in a race where the relevance of educational endeavor and the possibilities of development depend on their capability to evolve and find new ways, processes and structures to place knowledge in service of the community.” (Arechavala and Sanchez, 2017, p. 22). This fosters educational innovation and encourages methods other than the traditional ones, such as developing creativity, entrepreneurial thinking and a deeper learning approach (New Media Consortium, 2018).

Structural changes are the result of applying new models and modes that employ technological resources, especially Internet as the main platform, which has given rise to an exponential growth in distance education as a pedagogical innovation (Romiszowski, 2003). Therefore, educational models of Mexican state public universities are aimed at the promotion of better educational practices for their learners to be comprehensibly educated with solid professional competences and for life.

Two of these practices mainly stand out: the implementation of technological resources as a central focus in courses of studies and syllabi, and the inclusion of distance education, whether to support classroom courses, such as blended learning, or completely distance courses (ANUIES, 2018). The foregoing is evidenced when learner data and programs are analyzed, for example: the existing enrollment of distance education is 13% of the total higher education enrollment (SINED, 2017) and there is an upward trend; conversely, 240 institutions offer about 956 distance education programs or mixed learning programs, 42% of which are formal distance programs (407), 33% are extension programs (314), and 25% are classroom support programs (235) (SINED, 2017).

As may be seen, there is a wide range of distance higher education programs in Mexico; however, it is interesting that data on the development of teaching strategies and methods of this type are practically void. Reports in this sense point out the number and percentage of programs and institutions, as well as the enrollment received; however, it is necessary to describe how significant

learning experiences are proposed which go beyond classroom courses (Cervantes *et al.*, 2015). Choudhury and Pattnaik (2020) believe that the competitive advantages offered by distance education, such as flexibility, mobility and autonomy, ought to be strengthened by applying proper methodologies and strategies aimed to overcome challenges, mainly those of learners, to prevent isolation, procrastination, low time management capacity, and inadequate use of online learning strategies (Rasheed, Kamsin y Abdullah, 2020).

Another advantage is that university professors have assimilated the design of distance courses as part of their teaching endeavor (Baldwin, 2019); however, they ought to include strategies of easy application aimed to improve learning, to keep their attention, to take advantage of possibilities found in Internet and associated technologies (Sanchez, Langer and Kaur, 2020).

There are several strategies, such as the flipped classroom (Strayer, 2012), mobile learning (Motiwalla, 2005) or ubiquitous learning (Pimmer, Mateescu and Gröbiel, 2016) that have been successfully implemented in distance education; the foregoing notwithstanding, gamification (Deterding *et al.*, 2011) has enabled better learning experiences of learners in different educational levels. It is interesting, though, that gamification in higher education has attracted the interest of and motivation of learners, which has increased their commitment with their educational process (Ardila, 2019); for example, when using mobile applications in a virtual course (Wan *et al.*, 2015), or when changing complex working and traditional mechanics such as learning programming languages for a more ludic, closer and amicable language for learners of a school of engineering (Fotaris *et al.*, 2016); nonetheless, taking care that this type of strategies will not turn into a “repackage of traditional instruction strategies” (Wiggins, 2016 p. 27).

Regarding theoretical aspects, gamification is supported by three main theories: Fogg’s (2009) human behavior theory; Ryan’s (2000) self-determination theory, and Csikszentmihalyi’s (1990) flow theory; these theories are all based on motivation as a strengthening factor of participants’ interest and desire to continue in the game process. Although these theories are more representative for gamification, it must be admitted that they analyze participants’ behavior, as it is important to identify the target audience to learn what they like, whatever is encouraging and that it is even challenging for them.

With regard to the above, the theories of Bartle (1996), Jo-Kim (2012) and Marczewski (2013) are related to the existence of a participant who gives relevance to the social aspect, this is where experience with gamification is outlined to interact with others, set in an eminently social context; this is where integration of participants is sought to encourage the success of a specific activity (Jo-Kim, 2012).

Gamification is believed to be an innovative educational practice at different levels and modes, especially regarding human-computer interaction (Raap, *et al.*, 2019) with successful results, mainly in view of the commitment and motivation degree created thereby; however, better designs and educational implementations are a must, especially in the distance, with the purpose of verifying whether gamification enables learning of college learners, inasmuch as college educational models ought to be oriented to technological and curricular innovation, with novelty practices applied to ICTs to gain significant learning experiences. This inspired the investigators in this article to perform an empirical study at a university level with two general objectives:

- O1: To verify whether gamification strategies of a distance course are proper to be considered as innovative educational practices, in accordance with the elements of a university educational model.
- O2: To verify the relevancy of gamification strategies for a distance course by means of learners' perception who participate in this course.

METHODOLOGY

As mentioned above, this was an empirical study of the non-experimental type (Billet, Harteis and Gruber, 2014) and the study approach was of a qualitative nature. This was carried out in a distance course by means of an instructional design model titled Materials Design for Virtual Learning Environments, focused on an official course of studies of the Autonomous University of Yucatan (UADY), an institution located in Southeast Mexico; gamification strategies for the course were selected in accordance with several theoretical references. In order to gather information that would enable the assessment of gamification strategies, learners' reflective journals were used as well as their comments in discussion fora implemented in the course.

Designing the Course

This course was designed by using the ADDIE model (Gagné *et al.*, 2005). Figure 1 shows the model stages and the actions made for each of them for the distance course.

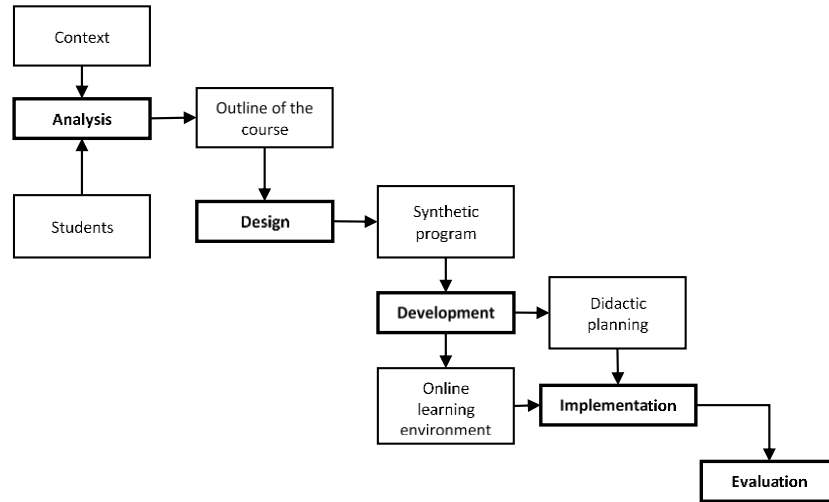


Figure 1. General design sketch of the online course using the ADDIE model.

This was a twofold analysis stage: context and learners. With regard to the former, the educational model of UADY was revised, titled Educational Model for Comprehensive Education (MEFI, by its acronym in Spanish), the basic guidelines of which are: education focused on the individual, development of personal independence, innovation, creativity, knowledge building, flexibility, among others (UADY, 2010). With reference to the latter, learners were enrolled in the Bachelor's Degree in Education course, whose generic competences are based on MEFI, which enables them to work in a virtual environment and with non-traditional strategies. These features were key to design the course, as no additional training on technological resources was necessary.

MEFI's focal areas were considered in the sketch of the course, especially the innovation focal area, due to its strong implication in the teaching-learning process as it "promotes a broad range of use of ICTs in teaching practice, it favors the creation of different learning scenarios, it incorporates active and innovative learning strategies" (UDAY, 2010, p. 43). In addition, it incorporated aspects which the educational model describes for designing learning experiences, such as the mobility of study (classroom, distance, and

combined), usefulness of ICTs, academic infrastructure of the institution and learning scenarios outside the classroom.

For the design stage, a course synthetic program was prepared to incorporate topics, objectives, assessment criteria and activities to be performed. At this point, a review of gamification strategies was performed so that they would be incorporated to the course design; following from this, Story-Telling was chosen (Lawrence and Paige, 2016) as a general course dynamics aimed to have learners involved, the Escape Room (Vita and Sarközi, 2017) as a basic mechanics to advance in story-telling and “the PBL triad: points, badges and leaderboards” (Werbach and Hunter, 2015 p. 75), as secondary mechanics for rewards and points.

Two tasks were performed in the course development stage: preparing a didactic guide and adapting the virtual learning environment. Didactic and teaching strategies were specified in the guide, as well as competencies to be developed, sequence and content disaggregation and assessment criteria. The three gamification strategies were developed in this document: to begin with, story-telling, where learners were included, the story was presented and the end was left in their hands.

Starting with story-telling, the manner to approach it and to finish it was done by using the escape-room strategy; therefore, the story was divided in 14 chapters, there were instructions for each chapter which the learners ought to complete for them to continue, otherwise, the next chapter would be blocked, so it was unlikely to move forward. Figure 2 shows a graphic representation of this process.

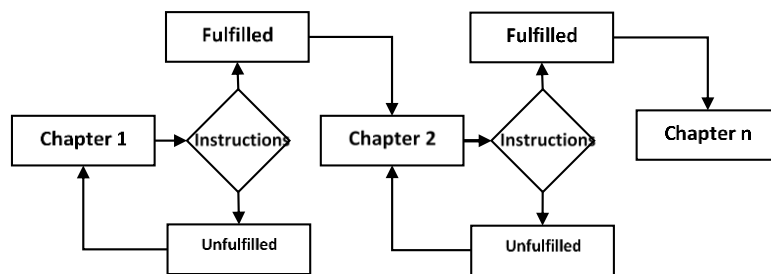


Figure 2. Mechanics for learners to move forward in the story-telling chapters.

The PBL triad was used when learners fulfilled the instructions; they were given points for complying with requested requirements; badges were given for task achievement, such as finishing a chapter before a scheduled time or for collaborative work; points earned were used for the leaderboards in their work teams.

With regard to adapting the learning virtual environment, every course was developed in the institutional platform of the Autonomous University of Yucatan (UADY-Virtual), based on the Moodle course management system (version 2.9). The tools of the system were used to work per chapters, to unblock them, for automated assignment of badges, leaderboards, and communication with learners.

The implementation stage was done in the intensive summer term, in the months of June and July 2019, with a period of four weeks, three hours a day, five days a week, with a total of 60 hours; this allowed learners to maintain constant work and attention during the course.

For the assessment stage, reflexive diaries were used where participants, at the end of each chapter, may post the experience they gained, what was most surprising, what they believed ought to be changed, and what they thought ought to be included to improve the course. Learners' comments were also used in different discussion for **a** in the course. All the information gathered was processed, coded, and classified, based on the Strauss and Corbin (1990) model; furthermore, a detailed reading activity was performed of each comment at the fora as well as of the reflexive diaries. This process was performed by means of the Atlas.ti program (version 9). Classifications and re-classifications of information, as well as the relationship thereof, enabled identification of topics analyzed in the results section.

LIMITATIONS

The sample was made by 31 learners of a bachelor's degree of UDAY; therefore, the size thereof limited the scope of the study; however, as this is a qualitative research, it focused in making a deep analysis of the learners' texts in their reflexive diaries as well as their comments in the discussion fora.

Before commencing the course, learners were asked for their consent to partake in the study, they were explained the purpose thereof and course features; everyone accepted to participate,

although it was likely that there would be biased comments on the diaries and on the fora. To prevent this, there were no directions or guidance for them to make comments on gamification strategies and on the study.

RESULTS

Findings were presented in two core blocks: the former shows results found in the analysis stage of the ADDIE model, and the latter, shows the results of the review of reflexive diaries and discussion fora performed by the learners during the course. The mode these results were presented is attributed to the objectives set out in the study.

Findings on the analysis stage

As the course was designed, during the analysis stage, it was found that the MEFI features allowed the development of innovative strategies, such as gamification. This affirmation was confirmed as the MEFI elements were linked together with the gamification features; initially, the three central actors in the distance education process were taken as points of comparison: learners, faculty, and technology, who are defined both by the educational model and by the different authors conceptualized in gamification. Conceptual similarities found in the three actors are described in table 1.

Table 1. Conceptual comparison of actors involved in distance education between the MEFI model and gamification.

Actors involved	MEFI	Gamification
Student	“[The student] constitutes the center of performance. [The student] is recognized as the main agent in the teaching-learning process” (UADY, 2010, p. 46)	Main character in the process of game activities (Kapp, 2012; Werbach and Hunter, 2012; Raap <i>et al.</i> , 2019)
Teacher	“Creates the learning conditions for the development of	Designs and develops the mechanics of the game. Overviews the development

	competences” (UADY, 2010, p. 48)	of the game. (Kapp, 2012; Kapp, 2014)
Technology	Element of innovation and tool for the educational process.	Resource that allows for the interaction between participants and the achievement of the development of interactive learning (Kapp, Blair and Mesch, 2014)

Although there are other elements that may be compared, such as instructional design, the intentionality of education and the levels of competency mastery, it is believed that the main actors involved in the educational process (learners, faculty and technology) ought to be fully identified both by MEFI and by gamification, which actually happens.

Learners’ experiences with gamification strategies

Based on the review of reflexive diaries and course fora, there were three extensive experiences of learners in the course using gamification strategies: 1) new learning modes, 2) difficulties, and 3) behaviors. Figure 3 shows a graphic representation of the results of this review.

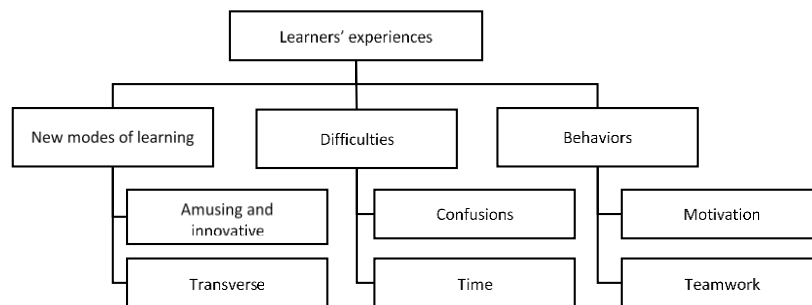


Figure 3. Learners’ experiences in the distance course with gamification strategies.

The first experience using gamification strategies showed new modes of learning, in view of how the activities were addressed. As this is by means of a story, unblocking chapters, with individual and group activities, the learners developed additional skills to those in the course, for example, to seek more information than required and to analyze it in order to solve the challenges raised by every chapter,

since they involved content from other courses and disciplines, which MEFI names “traverse competencies” (UADY, 2010, p. 75); furthermore, the learners said they had forgotten about the task concept and other concepts associated to the class, and that they had gone through a more amusing and innovative environment. In this sense, the following comments show said experiences:

Learner Carlos: Each time, I believe that my learning, skills and capabilities on the solution and use of new technological resources have improved. I will always think that this subject is a great way to teach what can really be of use to us as future instructors.

Learner Mariana: Without question, this is one of my favorite subjects in the whole course of studies. I am happy to have learnt in an innovative and amusing manner, surely, when I have become a practicing teacher, I will use several gamification types.

Learner Francisco: Undoubtedly, this course has left me astonished. This type of strategies is really useful for the teaching-learning process of the new generations, to make the study habit more interesting and fun.

Learner Manuel: One of the things I have learned is that you have to make more effort and to not be complacent. This subject has taught me to be more inquisitive and do more research.

Other experiences with the gamification strategies in the distance course were difficulties, primarily those related to confusion caused by the directions in some chapters and the time to complete them. In the first case, there were problems to understand what the learners were expected to do, because they said that the instructions were confusing to most of them.

Learner Manuel: This was quite a difficult mission because the instructions were not clearly understood, this caused the team’s confusion and delayed delivery thereof a bit.

This type of comments reflects the importance that instructions are to be made in a clear and plain language, to prevent that learners make several interpretations when performing the activities.

Another recurring difficulty was time, as they believed there was not enough. In some cases, product delivery was from one day to the next, which made team organization difficult:

Learner Gabriel: This chapter and the deliveries were “tougher” [sic], because we did not know that the [two] deliveries were meant for the same day, so we were too confident and when we entered the platform, delivery 8 had already expired.

Learner Maria: We were in a rush and the degree of complexity was really “ugly” [sic]. We had this complication with coordinates and as we finished we realized that the next delivery was also meant for this day.

These comments were a constant in some of the chapters where there were two products that were to be delivered on the same day. It must be clarified, though, that time of delivery for product delivery and activities in most of the chapters was two or more days, depending on the complexity of the topic.

Finally, there were two specifically identified behaviors: motivation and teamwork. Concerning the former, motivation was expressed in terms of self-determination to do the activities raised in the chapters, more than complying with the course objective or the points to be earned. In the case of teamwork, the learners said that the manner the course was raised allowed a more intensive collaborative work, whose commitment was reflected in the delivery of products of quality and a more significant desire to learn. In this respect, the comments reflected by these expectations are as follows:

Learner Lupita: I believe that the most significant learning I have obtained, not only from this chapter but from the course, is that learners are a lot more motivated through games and they are no longer “compelled” to do the task, but they are interested and they perform them with more energy and enthusiasm.

Learner Jaime: What I have learned, which was evidenced by each delivery as a team, is that we sought beyond the information we were given.

Learner Rosa: Making materials with this information makes us wonder whether we will only use it for the task or whether we understand it. It is as if we were building a significant but latent learning.

Learner Melisa: I liked the dynamics to do the chapters. The subject does not seem heavy to me because we have worked well as a team.

DISCUSSION AND CONCLUSIONS

Gamification is a permeated topic in the educational field from the conceptual point of view (Deterding *et al.*, 2011; Torres *et al.*, 2018), e.g. in educational practice (Fotaris *et al.*, 2019; Basten, 2018; Reyes and Quiñonez, 2018). In our study we found several points to be analyzed that allowed us to view how the gamification was carried out of a distance course in an institution governed by rules and an educational model such as MEFI at UADY.

In accordance with Chou (2015), gamification is defined as an innovative educational practice, because “if amusing and attractive

elements are used of videogames, this may give rise to an innovative manner of teaching” (p. 144). Conversely, Torres *et al.* (2018) acknowledge that gamification is clearly adapted to distance teaching needs. This is consistent with MEFI’s focal areas, especially three: competence-based education, learner-centered education, and innovation, whose implications favor the development of non-conventional educational modes, the use of ICTs and incorporation of innovating strategies. This suggests that, as an innovative educational practice, there are elements to affirm that gamification strategies in an educational university model such as MEFI may be properly employed in distance education, especially, strategies used in this study, such as story-telling, escape room, and the PBL triad. In short, MEFI states and promotes innovating educational practices, which enables implementation of gamification strategies in university distance education.

Concerning comments made by the learners, they were mostly positive; they made an emphasis on the fact that they learned a new, more amusing and transverse manner, i.e. beyond the contents of the subject, where teamwork was promoted, as well as commitment to continue and interest and permanent motivation; these elements are consistent with the findings of Ardila (2019) in connection with commitment, as well as with a more amicable and ludic environment (Fotaris *et al.*, 2016 and Raap *et al.*, 2019).

The learners also acknowledged that there were difficulties such as organizing time and confusion created by some instructions. The analysis of learners’ experiences regarding gamification strategies allowed confirmation that motivation elements may change the conduct or behavior aimed to strengthen a stronger desire to partake in the activity, and that is what Fogg (2009) has stated in his theory. Therefore, there are theoretical and empirical elements to confirm the suitability of the gamification strategies for a distance course.

RECOMMENDATIONS

Although this search was not expressly addressed to the faculty, there are implications for them, such as the commitment to develop gamification strategies for their courses. As the course was prepared for this study it was found that designing this type of strategies involves time and creativity, multidisciplinary and interdisciplinary work to develop the contents, to forget the likelihood of a lecture and to center in the creation of activities to encourage the search for information as well as the attainment of learning in the distance mode.

While it is true that the literature specifies that it is the current instructor who ought to assume new roles beyond the teaching activity, it is also true that the process has been a long and wearisome one for the current generation of instructors, but with good perspectives for the new professors who assume these roles in a more natural way and that are reflected in the media and methods used thereby.

More research is recommended from the professors' point of view in order to explore the implications of time and resources that are required to carry out a distance course by employing gamification strategies.

In accordance with Baldwin (2019), the faculty currently has the necessary competencies to design distance courses; gamification in this mode is an excellent strategy which fosters and changes a learner's perspective. If there are guidelines in the institution that enable this type of innovation in its rules, supported by a basic infrastructure (internet access and a platform), the investment to be made shall be time, talent and creativity of the teaching staff.

ACKNOWLEDGEMENTS

To the Program for Professional Development of Teachers, Higher Type (PRODEP, by its acronym in Spanish) for having financed this study under the call: Incorporation Support of New PTCs.

To the Faculty of Education of the Autonomous University of Yucatán, for having provided the facilities needed to perform this study, authorized the course, provided logistics support, as well as to learners of the Bachelor's degree in Education who participated.

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