Chapter 13

GAMIFICATION IN HIGHER EDUCATION:
THE LEARNING PERSPECTIVE

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Introduction

During the last decades there has been a great development of utilitarian systems, applied to the most varied areas, in which games are found. Digital games (or video games) entered everyday life at an increasing rate and became a popular form of entertainment enjoyed by people of all age and social groups (Williams et al., 2009). The first videogames came from a playful reappropriation of oscilloscopes (Tavinor, 2009). Since then, there has been a wide spread of game consoles (from Pong in 1972 to Xbox in 2002, etc.) as well as other video game applications. For example, in 2011, Gartner predicted that gamed-in information systems and services would become an integral part of organizational systems such as consumer goods marketing and customer loyalty with 70 percent of the largest organizations, according to (Burke, 2011) to have at least an application with principles of gamification. These forecasts went even further and the entrance of the gamification extended to the most diverse areas, namely Healthcare, Education, Finance, Wellness, and Corporate Governance. The use of gamification in unlikely areas such as politics, it is a growing trend as described in (Angelovska, 2019) "*this coincides with the beginning of the 2020 US political campaigns*."

Despite hype and growth expectations, several applications fail with gamification, leading to the appearance of designations like "*game over for gamification*" (Smith, 2015). This situation is justified by the way the gamification was used and one of the examples illustrating this same misuse is the experience of motivating housekeepers to become more efficient at Disneyland and at the Paradise Pier Hotels. The failure was related to the existence of public monitors that showed placards with efficiency numbers in green for the fastest employees, and red for the others. However, despite the unsuccessful experiences, gamification continues to be seen as a "tool" with great potential, as companies continue to invest in gamification projects, with estimates suggesting a market growth of 48% by 2019 (Technavio, 2015), and with values in 2016 of 4.91 billion US dollars to nearly 12 billion in 2021 (Statista, 2018).

Games are particularly known for their ability to engage and excite players, often leading them to seek to master techniques in order to reach higher levels, to develop skills, to feel pleasure; players usually immerse themselves in the context of the game (Huotari & Hamari, 2017), all of which are intrinsic characteristics of motivation in the human being. The particularity of the games is the autonomous nature of the activity, as well as the engagement and pleasure of the activity that encourages the player. This is the nature of the games that gamification technology tries to capture, harness and implement in contexts that generally have a more instrumental purpose (Vesa et al., 2017). When starting a game, a player challenges himself or herself against the final result; however, and due to the characteristics of the player, this process is often developed not only by challenge and competition but by pleasure, regardless of the outcome (Malaby, 2007). Incorporating the engagement and pleasure of the game process into activities outside the traditional area of the games is one of the principles of gamification. This approach allows the application and use of game elements to different types of systems, with the purpose of providing game experiences in non-entertainment areas, namely teaching-learning process (TLP) (Huotari & Hamari, 2017).

In the current context of teaching, one of the key challenges is how to engage students and increase their involvement in achieving the objectives of the proposed learning activities. One of the suggested solutions is to combine learning

strategies that involve active methods in combination with traditional methods (Moreira et al., 2018). Higher education institutions (HEIs), due to their characteristics, should make an effort when it comes to providing new teaching-learning methodologies, the need to adapt to new means (González Tardon 2015) and, especially, the students who present today different characteristics (Ma et al., 2016). Thus, in this framework active learning methodologies have been implemented, diversified and progressively improved. Gamification is one of those methodologies that, when applied, has had a positive result, as the literature (Urh et al., 2015; Gates & Kalczynski, 2016) demonstrates, and contributes to improving students' skills development for the 21st century.

Current context of the TLP in higher education

We live in a highly digitalized society, with continuous access to direct and indirect technology regardless of age, education, or profession. In order to evolve and create a real information society, people, and of course our students, must have basic technological competences that allow them to access sources of knowledge and permit them to benefit from those sources by recognizing their quality and reliability. Modern society's technological bias makes learning necessary for all groups to get a job, learn an activity, or simply communicate with other people and be informed. This implies a need to access technological devices and possess a set of basic abilities to interact with technological elements and their applications (Fonseca et al., 2018).

The literature points out that the correct use of most technologies stimulates the learning environments and promotes student motivation and engagement being these important factors, determinants for learning. This is because attracting and motivating NetGen people constitutes challenges for educators around the world (Kapp, 2012). The integration of technological innovations with the new practices can enable significant advantage. On the other hand, the present students, named Gen Z, who reach HEI, force a disruption in teaching process. In this context, it is justified the need to introduce new paradigms in the TLP.

As referred the characterization of generations over time has been conditioned

by the development of digital technologies and their application / use in every-day life by these same generations. Ma et al. (2016) present a study in which this reality is evidenced clearly and unequivocally. Table 1 summarizes some of the characteristics that describe / characterize the different generations. From the analysis of the mentioned table one can verify that the so-called traditional system of education does not conform to the current generations; so that there must be disruption in order for success in higher education.

Table 1. Characterization of generations over time (Ma et al., 2016)

Generation	Greatest / Silient	Baby Boomers	Gen X	Millennials	Gen Z
% relative to the global population	5%	15%	20%	27%	32%
Communica-tion style	Letter	Phone	Email/SMS	Instant Message	Emojis
Main technology	Car	Television	PC	Smartphone	Virtual / Augmented Reality
Digital Proficiency	Pre-Digital	Digital Immigrants	Early Digi-tal Adopters,	Digital Natives	Digital Innates

However, this need for disruption is not linear, since there is a lot of resistance on the part of the HEIs themselves (Buckley, 2015). Furthermore, the expectation of change is directly related to the fact that the expository experiences centered on the performance of teachers in the classroom still present a predominant style (Walker et al., 2008). Therefore, the need to reinvent education is latent, since this instructional model, consolidated in the nineteenth century, "*has now also to meet the demands and needs of a democratic and inclusive society, permeated by differences and guided by the inter, multi and transdisciplinary knowledge, with which we live in this early 21st century*" (Araújo, 2011). This change is necessary because as stated by Chickering and Gamson "*Learning is not a spectator sport.*

Students do not learn much just by sitting in class listening to teachers, memorizing prepackaged assignments, and spitting out answers. They must talk about what they are learning, write about it, relate it to past experiences, apply it to their daily lives. They must make what they learn part of themselves" (Chickering & Gamson, 1987).

In order to meet this need, in the last decade, according to Freeman et al. (2014) classes that resort to active learning have attracted a great deal of attention, since they stimulate students' motivation to seek to build higher competences. According to Fraser et al. (2014) "*In the context of new pedagogical trends, the Active Methodology is one of the possible strategies, for which the student is the central protagonist, that is, responsible for his/her educational trajectory and the teacher is as a facilitator of the experiences related to the learning process*". However, "*literature rarely identifies the key elements of pedagogical innovations or explains how to implement them in the classroom.*" (Maia et al., 2012).

The active learning methodologies (Bonwell & Eison, 1991; Davis, 2009; Wentzel & Wigfield, 2009; Felder & Brent, 2009) are, in turn, student-centered approaches that they transfer to those the responsibility over the management of their learning experience. It is advised to place students often in a situation of collaboration with classmates. In an active learning situation, teachers assume the role of facilitators or mediators rather than information providers in a unidirectional way. The presentation of facts, often introduced through direct reading, is mitigated in favor of class discussion, problem solving, cooperative learning and writing exercises (classified and unclassified). Other examples of active learning techniques include role-playing, case studies, gamification, group projects, or role-reversal dynamics such as think-pair-share, peer teaching, debates, Just-in-Time Teaching, small practical demonstrations followed by class discussion and gamification.

HEI's policy regarding the improvement of TLP is to encourage the adoption of active methodologies because, on the one hand, it is believed to be the most adequate for success in the acquisition of competencies and, on the other hand, meet the characteristics of the students who are coming to HEIs, with the aforementioned.

The need to involve the generation of students who are coming to HEIs leads teachers to make an effort to change their pedagogical practices that have sometimes followed for many years. This is because the generation of students who, as referred to, attend HEIs have a very great attention deficit when they are confronted with classes that use the expository-active method. Thus, it is necessary to interrupt the knowledge transmission stream and create alternative activities that lead them to refocus along the sessions in the classroom context.

Engagement, Motivation and Innovation in TLP

Looking back at the different challenges in higher education, new student centered approaches to the TLP has been defined to enhance student engagement and motivation in classrooms as referred in the above section.

The definition of students engagement according to the Glossary of Education Reform (2014) is *"...the degree of attention, curiosity, interest, optimism, and passion that students show when they are learning or being taught, which extends to the level of motivation they have to learn and progress in their education."* In this context, it can be stated that student engagement is a key factor that influence your academic success.

According to Sinatra, et al. (2015) student engagement has been classified as "*holy grail of learning*". Generally engagement refers to the extent to which students invest or commit to learning (Zhang & Hyland, 2018). Engagement is by itself a generic term but it has brought together students' attention, curiosity, interest and willingness to use their learning skills to progress towards the acquisition of new skills, both technical and behavioral.

Student engagement is a multidimensional (multifaceted) construct that can be measured with all the dimensions dynamically interrelated. Student engagement typically includes three dimensions (Martin & Torres, 2016) (Figure 1):

- Behavioral engagement – Students who are behaviorally engaged would

typically comply with behavioral norms, such as attendance and involvement, and would demonstrate the absence of disruptive or negative behavior.

• Emotional engagement – Students who engage emotionally would experience affective reactions such as interest, enjoyment, or a sense of belonging.

• Cognitive engagement – Cognitively engaged students would be invested in their learning, would seek to go beyond the requirements, and would relish challenge.

Figure 1 – Dimensions of students' engagement.

In this context, the student engagement is considered as a psychosocial process, influenced by institutional and personal factors inserted in a wider social context, integrating the sociocultural perspective with the psychological and behavioral visions.

The literature when analyzing engagement includes motivation. However, Bergdahl et al. (2018) state that engagement and motivation theories are closely

related, and motivation theories can inform studies of engagement, and vice-versa, but these are different constructs. According to the authors, the motivational theories can be intrinsic in nature, such as student interest, and/or extrinsic, for example notes or expectations created by parents. Intrinsic motivation to learn is a more effective strategy to get and keep students interested. However, to Stipek (2002) "…*most realistic people in the field say that you've got to have both… You can rely entirely on intrinsic motivation if you don't care what ... learn, but if you've got a curriculum and a set of standards, then you can't just go with what they're interested in.*" Moreover, van Roy & Zaman (2018) argue that it is the kind of motivation that drives behavior and performance. On the other side is demotivation, a situation in which a person has no intention to perform a given behavior, yet according to the authors there is a continuum with four types of motivation ranging from intrinsic to extrinsic and finally to amotivation (Figure 2).

Motivation types

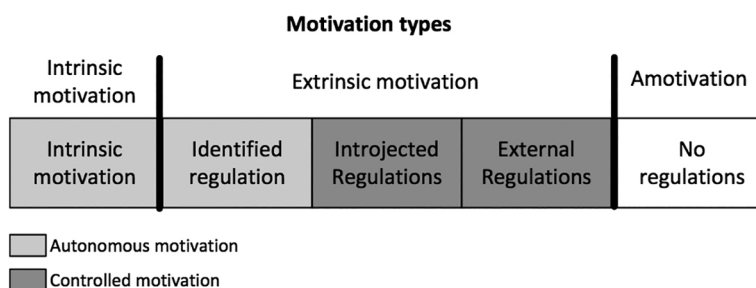| Intrinsic motivation	Extrinsic motivation			Amotivation
Intrinsic motivation	Identified regulation	Introjected Regulations	External Regulations	No regulations

Autonomous motivation
Controlled motivation

Figure 2 – Motivational types (van Roy & Zaman, 2018).

However, the literature shows that motivation alone is not sufficient for the student to continue learning. Boekaerts (2016) suggests that while students are not ready to employ self-regulatory, they still engage. Moreover, innovation must be part of the TLP of the students in order to motivate and engage them and consequently succeed in acquiring new skills.

According to Serdyukov (2017) to innovate is to look beyond what is currently being done and to develop a new idea that will help to accomplish the work in a

new way. The purpose of any invention is therefore to create something different from what we have done, whether in quality or quantity, or both.

In education, innovation may appear as a new pedagogical theory, methodological approach, teaching technique, instructional tool, learning process or institutional structure that, when implemented, produces a significant change in TLP leading to student success. Thus, innovations in education must result in significant improvements in the efficiency, effectiveness, or quality of outcomes (Australian National Audit Office, 2009).

If we focus on educational innovation, based on the ideas expressed in Vanderlinde and Van Braak (2010), it can be described as the process of changing teaching or learning activities that produce improvements in student performance. However, in order to consider this process educational innovation should respond to certain needs it should: be effective and efficient; be sustainable over time; and produce transferable outcomes beyond the particular context in which it arose. In order to assess the needs identified, we can define other variables to be studied, namely the relationship between student motivation, degree of satisfaction, and the user experience; or student perceptions of their interaction with and teaching of applied collaboration (Sun & Hsu, 2013; Giesbers, et al. 2010).

Gamification

Gamification concept

The term gamification, originally introduced by Nick Pelling in 2002, began to gain popularity in academic circles only in 2010. One of the first, and most popular, definitions is that provided by Nacke et al. (2011), which simply define gamification as "*the use of game design elements in non-game contexts*". This definition describes the means (use of game design elements) and the context of application (non-play) of gamification in broad terms. Some subsequent definitions describe more specific means, objectives and application contexts of gamification. In the various definitions found it is possible to highlight the following:

- "*adding game elements to an application to motivate use and enhance the user experience.*" (Fitz-Walter et al., 2011);

- "*Gamification can motivate students to engage in the classroom, give teachers better tools to guide and reward students, and get students to bring their full selves to the pursuit of learning. It can show them the ways that education can be a joyful experience, and the blurring of boundaries between informal and formal learning can inspire students to learn in lifewide, lifelong, and lifedeep ways…. [However,] by making play mandatory, gamification might create rule-based experience that feel just like school. Instead of chocolate and peanut butter, such projects are more like chocolate-cover broccoli.*" (Lee & Hammer, 2011).

- "*a process of enhancing a service with affordances for gameful experiences in order to support user's overall value creation*" (Huotari & Hamari, 2012);

- "*the use of game design elements (e.g., points, leaderboards and badges) in non-game contexts … to promote user engagement*" (Mekler et al. 2013);

- "*the use of game-based elements such as mechanics, aesthetics, and game thinking in non-game contexts aimed at engaging people, motivating action, enhancing learning, and solving problems*" (de Sousa Borges et al., 2014).

From the various definitions presented the common points that emerge are: the need for gamified systems to have specific user engagement objectives; and instrumental goals are how to achieve them through the selection of game design elements. What is not indicated in these definitions is how to select those design elements for specific tasks, and how they interact with each other and create the user's intended interactions in order to promote user engagement and lead it to the intended instrumental objectives.

According to Deterding et al. (2011) the characteristics of Gamification are:

1. It is easy with null cost.
2. No need to generate new contents, it only improves the way of learning.
3. Step by step implementation of an experiment.
4. There are no chances of losing the game.

Games used on a day-to-day basis not only serve to entertain users, but also help shape their behavior. The dynamism and engagement of the user should be increased in teaching in general and in e-learning training in particular, as mentioned by Dichev et al. (2014), since the difficulty of establishing commitments between students and the platforms is more difficult due to the characteristics of the distance courses. Muntean (2011) shows that gamification can be strongly used in students' learning behavior because it positively increases the development of solutions to problems, but in a more playful way.

The development of gamification solutions must take into account the users extrinsic and intrinsic behavior. Extrinsic motivation is related to motivation triggered by gifts, while intrinsic motivation is the motivation that arises from self-interest (Surendro & Raflesia, 2016) as referred to in section 3.

Gamification and the main motivational and engagement mechanisms

To create a gamification instruction it is necessary to understand the behavior / profile of the student in general, and in particular, the best way to achieve their engagement. In this sense, Zepke & Leach (2010) identified four key perspectives to categorize actions that improve student engagement: motivation and agency, transactional engagement, institutional support, and active citizenship.

The use of game attributes will affect the student's learning behavior and attitude. Tu et al. (2015) consider that gamification is not just an application, but is a thought process as it provides a better learning experience and an instant feedback environment. This strategy included a rewards system for the successful completion of a task / challenge.

According to Silpasuwanchai, et al. (2016) gamification is not just a matter of adding the most common PBL (Points, Badges and Leaderboards) elements to any digital task, but rather carefully designing the gamified systems that promote the desired behaviors (Burke 2012). To answer this question Dixit et al. (2018) propose five steps to be performed in gamification: (i) understanding of students' abilities as well as the context that defines instruction; (ii) definition of course

learning objectives; (iii) before implementing gamification, it is mandatory to formulate teaching experience with details of execution (individuals, groups, class size, face-to-face, online); (iv) identify points that may pose obstacles; (v) how resources will be used - decide whether to use an existing game, or whether to create and use a new game, before implementing the game. Additionally, Saputro et al. (2017) show that the various elements of the game can be used to encourage increased intrinsic student motivation. Their research results in a set of intrinsic motivational elements along with game elements, as shown in Table 2.

Table 2. Elements of the game in the intrinsic motivational elements
(Saputro et al., 2017).

Elements of intrinsic motivation	Appropriate gaming elements
Autonomy	Level, unlock a level, meaningful choice, progress bar, Skill tree, Avatar World, narrative, leaderboards, onboarding, quests, mission, lives.
Competence	Badges, Leaderboards, performance graphs, points, XP, grades, level, dashboards.
Relatedness	Collaborative work, competition, badges, social status, leaderboards, quests, storyline, avatar, teammates.
Purpose	Virtual Map.

The elements of intrinsic motivation can be used as a reference to determine the right elements of the game to encourage the creation of students' intrinsic motivation to participate, for example, in distance learning courses. However, it is necessary to study in depth how to integrate the elements of the game into learning along with the steps that must be organized in the solutions defined. Any solution that uses gamification must be validated by experts in the fields of technology and psychology, because according to (Zichermann & Cunningham, 2011) "*gamification is 75 percent psychology and 25 percent technology*." This validation must be performed in such a way that the elements of the game can be implemented correctly in a Learning Management Systems (LMS), such as Moodle.

When the gamification from the point of view of psychology is observed Sailer, et al., (2014) suggest that the common elements of gamification (PBL, Progress bars and charts, quests e meaningful stories and avatars) are mapped in the six main motivational mechanisms, as shown in table 3.

Table 3. Gamification elements mapped on the six main motivational mechanisms (Sailer, et al., 2014)

Perspective	Users …	Elicited by …
Trait	will be more likely to be motivated if they experience achievement, success, progress, control and membership	Badges Leaderboards
Behaviourist Leaning	are more likely to be motivated when immediate positive feedback is received in the form of rewards	Points Badges
Cognitive	are more likely to be motivated by clear and achievable goals, demonstrates the importance of a user's action and encourage the mastery of skills and goals	Badges Progress bars and charts Quests
Self-Determination	are motivate by felling of competence, autonomy and social relatedness	Badges Leaderboards Meaningful stories and avatars
Interest	are motivated by interests in the situational context, clear goals and adapting the level of difficulty to the user's skill level	Points Badges Progress bars and charts Quests Meaningful stories and avatars
Emotion	are more likely to motivated by decreasing negative feelings, such as fear, envy and anger, an increasing positive ones, such as sympathy and pleasure	Meaningful stories

Gamification in TLP in higher education

The Potential of gamification

In educational processes there is the possibility of adapting, as a teaching tool, interest, attraction and motivation in order to strengthen the learning process (Herranz & Colomo-Palacios, 2012). The effect of applying gamification techniques lies in influencing students' behavior to achieve specific learning objectives, having an appropriate alignment between the objectives of the game and the learning objectives. If such alignment is achieved, gamification improves the student's experience, following the goal of motivating, reaching, promoting and maintaining greater participation in the TLP and, in turn, promoting collaboration between students and teachers during the game (Payne et al. al., 2008). In short, gamification is a practice that favors the co-creation of knowledge and allows a closer relationship between teaching and learning.

The creation of mutual knowledge or co-creation is related to the perspective of open innovation, in terms of cooperation to combine knowledge between students and teachers, defining a teaching-learning strategy that values the general contributions. This implies, in line with the question posed by Lichtenthaler & Ernst (2006), to develop three main activities through play: (i) to acquire knowledge; (ii) integrate knowledge; and (iii) explore knowledge. In this sense, with regard to the co-creation of knowledge, it is useful to consider the notions systematized by Sobrino (2014), which addresses the differences between the concepts of interaction and interactivity in their contribution to learning processes, in which interactions involve the development of the ability of individuals to influence each other, while interactivity is restricted to the incorporation of means and tools into the process, which ultimately should improve cooperative learning.

Following the approaches of Herranz and Colomo-Palacios (2012) in the application of gamification as strategy, it is also necessary to consider a set of considerations, in the perspective of giving meaning and sustainability to the incorporation of games as teaching-learning method. However, it is important to highlight that according to Geymonat (2014), there are many teachers who

consider the use of games as a strategy to improve the development of knowledge, skills and attitudes, to motivate learning and skills development.

Gamification experiments with LMS Moodle

As discussed earlier, games have characteristics that exert fascination on people. Vianna et al. (2014) consider that the relationship between the mechanisms of games and human behavior are understood more deeply when studied the profiles of players and the motivations that sensitize each one of them. Zichermann & Cunningam (2011) explain that players are motivated to play for different purposes, and that these purposes lead to different behaviors within the context of the game. By analyzing players' different motivations and behaviors, they summarize player profiles in four broad groups: Killers, Explorers, Achievers and Socializers.

In this context, it is necessary to identify the tools that can be used to create a course with gamification techniques. For this purpose, both the native LMS tools (Edmodo, Moodle, Blackboard, etc.) and the external plug-ins contribute. It is important to note that even tools that were not originally developed for gamification can be adapted to this, provided that the LMS have integration mechanisms. This occurs because the gamification process is not necessarily linked to the functionality of a tool, but to the way it is used.

In LMS Moodle, for example, in addition to all the advantages, resources and activities (videos, activities, forums, research, library, chat, among others), it is possible through gamification to observe the performance of each student according to their score and the competitive behavior of students to remain in first place in a ranking.

For the identification of native tools and plug-ins, gamification elements of the Octalysis frameworks (Chou, 2014) and The Periodic Table of Gamification Elements (Marczewski, 2016) were used. In addition, a relationship between tools and player profiles is made (Bartle, 1996), indicating some possible ways to use tools for student motivation through gamification. Table 4 summarizes available tools and related profiles for native Moodle elements and external plug-ins.

Table 4. Native tools and Plug-ins of Moodle for gamification
(adapted from (Silva, 2018)).

Tools		Player Profiles			
	Killers	Explorers	Achievers	Socializers	
Native	Blog		X		X
	Chat				X
	Forum	X	X		X
	Medalhas	X			
	Quis	X		X	
	Wiki		X	X	
Plug-ins	Leaderboarad	X			
	Level Up!	X	X	X	
	Progress Bar			X	
	Checklist			X	
	Stash		X	X	

As mentioned, the gamification in education is presented as a solution that aims to promote students' interest through collaboration, participation and fun (Bardo, 2013). The use of gamification systems has as main objective to keep individuals involved in their activities, and therefore teaching has been one of the main fields of experimentation of gamification (de Quadros, 2013).

The LMS Moodle is one of the most popular virtual learning environments in the world (Capterra, 2017), and has evolved as a tool, making it a platform in which application of gamification is a reality. Some developers have created plugins to facilitate the application of gamma strategies in the referred LMS. An example of applied scoring in learning in virtual environments is Mozilla Open Badges[1]. The system issues digital badges and medals to reward skills and achievements of user activity from a course created in LMS Moodle. As of version 2.5, the platform included the possibility of using badges through the Open Badges Infrastructure (OBI).

1 https://openbadges.org/

The use of Moodle as a platform for the application of gamification in higher education is now a reality, as can be seen from the several examples presented in the most recent literature. Among the various published experiences, the following set out stands out.

Jucá et al. (2014) present an example of gamification, which was used with the intention of engaging students in higher education. The authors used game design strategies such as challenges, goals, points and badges in an entrepreneurship course. These strategies had as theoretical principle the "Gamification Design Framework" (Werbach & Hunter, 2012), and the result was quite positive.

Serra, et al. (2016) used a plugin for Moodle called BlockRanking. The objective of the researchers and teachers was, besides increasing the resources of gamification in the courses, to carry out a continuous monitoring of the students through the analysis of their scores.

The work presented by Tuparov et al. (2018) aimed to develop a framework to identify gamification characteristics through the use of Moodle, based on a case study for the implementation of gamification in peer assessment and self-assessment activities. The results were relatively positive because they failed to implement the peer assessment.

In (Kermek et al., 2018), an experience of utilization of gamification in higher education for 2 years is presented. In this study, it was verified on the one hand that the results obtained were positive in some activities, such as surveys and self-assessment test. And, on the other hand, it was found that the materials made available had a significant increase in their use. As a less positive aspect, it was the decrease in student interest over the semester.

The teaching of programming always presents a great challenge, since the students reach the HEI without having developed the necessary skills to adapt to this paradigm that is the programming. Jen and Said (2018) conducted an experiment with application of gamification in teaching the Java programming language. The authors incorporated game elements for the purpose of engaging, providing feedback, and defined homework to encourage informal learning. The results show

that most of the students felt motivated to learn programming after participating in gamification activities.

Oliveira et al. (2018) propose a framework for applying structural gamification in Moodle for the online training of TRT-2 members and civil servants. From their experience, the authors states that Moodle has several features to gamify a course: activity completion, restricted access, progress bar, badges, score (to add games made with software like Storyline) and grade. With experience, the authors were able to improve TLP with high student satisfaction.

Jurgelaitis et al., (2019) present a research work regarding the teaching of the Unified Modeling Language (UML). The authors, in the course development, used gamification techniques through the use of some gratification elements (coins, items, and badges), the leaderboard, content locking and trading. The obtained results confirm that the student classifications can increase as a result of the application of the gamification in the TLP, as well as its motivation.

Synthesis

This article focuses on gamification. The gamification emerges as another methodology, within the active methodologies, that in the context of TLP contributes to promote student motivation and engagement. Digital students for whom the so-called traditional methods - expository classes - fail to create a sufficiently motivating learning environment and consequent school success so desired by teachers and demanded by society.

From the foregoing it can be seen that gamification alone does not represent an addition, gamification has to be based on scientific principles both in its conception and in its operation and must be innovative. Finally, it can be verified that the gamification when used in the TLP following the above contributed to the students' academic success, increasing and solidifying their technical and behavioral skills.

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