


Psychology as a foundation for motivation strategies in the modulation of behavior through gamification

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ABSTRACT

Abstract: In the contemporary context, it was necessary to evolve the learning processes, which are being driven by multidisciplinary and technological approaches, seeking to increase the levels of motivation and engagement of students. Gamification emerges in this context as a strategy for this, since it accelerates learning, encompassing strategies of intrinsic and extrinsic motivations to increase the involvement of subjects even in activities considered monotonous and difficult to perform or even to modify behaviors. It should also be noted that gamification is based on psychological theories, encompassing cognitive, emotional and social aspects during and after the application of the gamification activity. This article aims to discuss and advocate the ways in which Psychology bases intrinsic and extrinsic motivation strategies so that behavior modulation can occur through a literature review.

Keywords: Gamification, Psychology, Intrinsic Strategies, Extrinsic Strategies.

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INTRODUCTION

Since, from Busarello (2016) onwards, the practices related to the learning process must be constantly adjusted to the reality of individuals and with a focus on monitoring the technological transformations of society, in the modern context, we seek to stimulate learning through multi and transdisciplinary means with the objective of raising the motivational and engagement levels of individuals with the purpose of providing more effective and relevant experiences to the subject, In this context, one of the possible strategies to be used is *gamification*.

Gamification is understood as an - essentially - technological phenomenon which is concerned with employing strategies and game design in contexts parallel to that of games themselves (DETERDING *et al.*, 2011, 2013). Gamification techniques can be applied in a wide variety of contexts, such as educational, organizational, sports, politics, and even health (COSTA; MARCHIORI, 2015). It is noteworthy that game elements are often used in these scenarios with the aim of engaging, influencing and even modifying certain behaviors of individuals and collectives (BUNCHBALL, 2010).

According to Busarello (2016), turning the learning process into a game represents a viable challenge. Properly creating a game can help students gain skills and knowledge quickly, improving information retention. This is considered a serious approach to accelerate learning and understanding of complex subjects.

In this sense, *gamification strategies* can be classified as intrinsic or extrinsic. It is important to highlight that it is essential to know how to combine the use of these two forms of motivation, since in *gamification* the effective combination of intrinsic and extrinsic motivations "increases the level of motivation and engagement of the subject" (BUSARELLO, 2016, p. 17).

With regard to the elements considered intrinsic, they are those understood as attributes inherent to the subject without necessarily being located or physically located in the external and social environment (ZICHERMANN and CUNNINGHAM, 2011). Lopes, Toda and Brancher (2015) describe an example of an intrinsic gamification strategy by describing the feeling of competition as

A feeling of rivalry that instigates players to compete against each other within the game environment. This motivates them to become better than others. Unlike the scoreboards, this element analyzes and evaluates the sense of competition, inherited by all individuals (p. 3).

The cited authors counter this definition by listing a second strategy that receives the same classification, cooperation.

Although competition is an inherent factor in human beings, some individuals prefer cooperative activities. This element was greatly influenced by the technological evolution that allowed communication and interaction between players within the game (LOPES; ALL; BRANCHER, 2015, p. 3).



These are just two examples of intrinsic elements in the phenomenon of *Gamification* which will be covered in greater depth later in the course of this article. Even so, the capacity and potential of these strategies in engaging and motivating people is highlighted through components often seen as "playful to encourage the individual to continue performing an activity in a more fun, dynamic and, consequently, efficient way" (SILVA; OLIVE TREE; MARTINS, 2017, p. 2).

Regarding extrinsic motivation strategies, Busarello (2016) points out that these, in turn, "are based on the world that surrounds the individual, being characterized as external to the subject." Extrinsic motivation "has as its starting point the subject's desire to obtain an external reward," such as social recognition and material goods. This motivation happens when someone or something determines to the subject the action that must be done, such as: points, prizes, missions and rankings. (BUSARELLO, 2016, p. 55).

It is relevant to point out that some extrinsic rewards can destroy intrinsic motivations, since they can be responsible for affecting the motivational aspect of the individual (BUSARELLO, 2016). Another important point is that although extrinsic rewards appear to be less effective than intrinsic ones, it is noteworthy that both forms of motivation exert influence in determining the individual's behavior.

Finally, the contribution of psychological science to the phenomenon of gamification is also highlighted, given that gamification is based on psychological theories that employ motivational models, covering cognitive, emotional and social aspects of the person during the act of playing. Psychology is a theoretical pillar of *gamification* together with areas such as Design and Computer Science, and with this, it contributes, in part, to the investigation of the veracity of the motivating elements of human behavior behind *gamification*.

METHODOLOGY

This article aims to provide a better understanding of the ways in which intrinsic and extrinsic motivation strategies act in the modulation of behavior, as well as stimulate learning through gamification tools. To this end, a descriptive research was carried out in order to conceive and detail the relationship between two variables (GIL, 2002), in this case the phenomenon of gamification and psychological science. In this sense, it was based on a bibliographic research, defined by Gil (2002, p. 3) as that "developed based on material already prepared, consisting mainly of books and scientific articles."

Regarding the data approach, the qualitative character applied to the present research is noted, since the data analysis was obtained through a literature review, aiming at data related to the understanding of the intersection between gamification and psychology with a focus on intrinsic and extrinsic motivation strategies. The literature search was initiated with the search for the terms



"Gamification" and "Psychology" in the following databases: PubMed, ScienceDirect, Scielo and Cochrane Library. After the articles were registered, the data were analyzed for screening and the results were discussed. We sought to analyze and understand the psychological theories, in the cognitive, emotional and social aspects of the gamification strategy.

RESULTS AND DISCUSSION

The initial results of the research demonstrated the existence of a database still in the construction stage. The results found in the search for the terms "Gamification" and "Psychology" in the different databases were: PubMed (331), ScienceDirect (1,257), Scielo (3) and Cochrane Library (62). We emphasize that the reduced number of findings in the Scielo database was maintained, even with the search for terms in Portuguese or Spanish. These numbers demonstrate a predilection for publication in English and in journals with a broader scope focused on education and social sciences, which is the profile of the ScienceDirect database. Another important result obtained so far was the detection of a changing trend, identified by the temporal analysis tools of publications provided by the researched databases. Initially, the focus of the articles was predominantly focused on education and today there is a high incidence in the application of gamification in the areas of health, sports and others.

GAMIFICATION - A HISTORICAL PHENOMENON TODAY

Discussions regarding the emergence and subsequent popularization of *gamification techniques are controversial*. A significant number of authors consider that the term mentioned has gained greater proportions approximately from 2010 onwards (PASSARELLI-ARAUJO; PASSARELLI-ARAUJO, 2019), however, research and reports dating back to the 1950s emphasize that the premise of *gamification* was already applied at that time. An example of this would be the use - by the leaders of the former Soviet Union - of game attributes as substitutes for monetary incentives to perform jobs and tasks considered monotonous and difficult to perform during the cold war period (DICHEVA *et al.*, 2015). This fact emphasizes the applicability of *gamification* strategies as plausible enhancers of different types of learning in the most diverse areas of knowledge and life of individuals (FARDO, 2013).

In the field of education, for example, especially during and after the period of social isolation caused by the COVID-19 pandemic, the abrupt and rapid insertion of technology in schools produced a

rupture with past customs, provoked by the expansion of information technology and [the] inauguration [...] of virtual environments that go beyond physical spaces and redesign new ways of transmitting knowledge (Passarelli-Araujo; Passarelli-Araújo, 2019, p. 2).



In this context, the task of "competing" for the engagement and attention of students of the most varied ages becomes increasingly arduous, given that there are several possibilities that are sometimes considered more attractive (VAN ECK, 2006). Gamification, if inserted in education, can be an excellent tool to boost student motivation, as it can approximate the levels of engagement seen in the applicability of games, for example. An example could be evidenced in the case study developed by the Laboratory of Information Technology and Educational Media (LabTIME) with the objective of "introducing the principles of computer science applied to game development" (PASSARELLI-ARAÚJO; PASSARELLI-ARAÚJO, 2019, p. 4), thus students were immersed in a programming course that had an online game-themed sphere, where not only did the appearance seem to resemble that of a *game*, but the modules or chapters were unlocked as different phases with progressively greater complexity, measured through named evaluative activities and with the aspect of missions (PASSARELLI-ARAÚJO; PASSARELLI-ARAÚJO, 2019).

A number of other studies have addressed a similar gamification methodology to reduce dropout rates and low interaction seen, above all, in online courses such as the aforementioned one. In the meantime, it is worth highlighting the results obtained by Khalil *et al.* (2018) proving that the implementation of gamified techniques in courses offered free of charge and in the distance learning modality obtains a higher level of involvement and participation on the part of students. It should be noted that, in a comparison between the most recent version of the course pointed out by Khalil *et al.* (2018) - prior to the employability of gamification, in 2015 - and the experimental group that took the course in 2016, in its new version, the completion rate increased from 19.74% in 2015 to 26.05% in 2016. Corroborating with a decline in the dropout rate.

In the sports field, on the other hand, the mission of applying gamified strategies would not be costly, since the premise of most sports would be the rivalry and the "passion" that leads a group of people to cheer and defend their favorite team under the most diverse circumstances (FRANCISCHINI, 2005). In this sense, in a strategic way, the first *fantasy game* to become popular and acquire stability by Brazilian users was created in 2004. Cartola FC emerges as a gamification of the biggest and most well-known competition in the national sport, the Brazilian Football Championship of the A series, also known as "Brasileirão" (JUNIOR, 2014). On the aforementioned platform, users can sign up for free in order to take on the role of sports coaches, casting players - real figures of teams in the Brazilian championship - and positions in which the virtual team will appear in a round of real-world competitions. The matches, as well as the obtaining of penalties conceded and the goals and victories won, generate statistics and culminate in the hierarchy of the performance of each participant through a ranking system. Over the years, Cartola FC has brought updates in dynamics and prizes to users, which gave the *fantasy game* "an average of 1.5 billion views per month, with 1.7 million users accessing it per day and more than 4.6 million teams



created" (TREMONTI, 2023). Highlighting the success of gamification strategies, too, in the sports universe.

In addition, in the health area, gamification was seen as an ally in the engagement and motivation of people in relation to their well-being in various modalities such as the practice of physical exercise, greater use of water and the adoption of a balanced diet (BRAGA, *et al*, 2022). The low income added to the duties and the hectic day-to-day routine can be factors that hinder the population's access to physical and mental health care. One strategy found by some is the use of cell phone applications that gather information and techniques for greater well-being. In this regard, a 2022 study showed that "about 29.4% of internet users use applications focused on health, physical exercise, and nutrition" (BRAGA, *et al*, 2022, p. 2). It is noted that most of the applications mentioned include gamification tools, such as feedback, monitoring, reward, threat and goals/planning aimed at managing comorbidities, preventing diseases, encouraging the practice of healthy lifestyle habits. Under this bias, Krishna (2009) conducted 25 clinical studies with a sample of 38060 patients who made frequent use of gamified applications for health promotion and found clinical evolution of underlying diseases such as diabetes in about 92% of the patients evaluated, as well as improvement in their quality of life.

The referenced cases attest to the assertiveness in the use of gamification strategies in the educational, sports and health spheres and can be seen and adapted in the organizational, traffic and other domains. With this in mind, it is appropriate to point out that gamification tools have been the target of numerous researches and currently one of the most accepted and widespread models for understanding gamification and its techniques is named Octalysis (CHOU, 2016). This model focuses on human behavior and presents eight gamification elements categorized into intrinsic and extrinsic motivation. Intrinsic motivation would be the human and innate tendency to feel motivated to do something for the sheer pleasure of doing it, while extrinsic motivation is established by the presence of an external factor that promotes the incentive to perform a certain task, usually occurring with the intention of receiving approval or reward (FRANCO, *et al*, 2015).

INTRINSIC MOTIVATION STRATEGIES

The intrinsic nature of motivation is understood when it occurs despite the environment, i.e., the outside, seeming favorable or unfavorable, since it develops through the innate pleasure of accomplishing something. Commonly, this type of motivation makes a person feel challenged, committed and interested, conceiving an emotional and non-transactional involvement (RIBEIRO; MONTENEGRO; DE SOUSA NETO, 2019). In the model of Chou (2016) mentioned above, the elements of intrinsic motivation are found on the left side of Octalysis, namely: Development and achievement; possession and scarcity.



The core drive "Development and Achievement" is understood in gamification as the conception of progress, maturation, overcoming challenges and developing skills. Think of the example of a person who is learning a sport, such as judo, for example. The acquisition of a new belt (white, yellow, gray, etc.) and the development of a new move/movement can lead to the feeling of Development and Achievement contained in Octalysis (Chou, 2016).

With regard to the core drive named "Possession", it can be conceived as the feeling of possession, detention and ownership (NAYARA; OF THE BEAUTIFUL CROSS; DE FREITAS, 2016). This feeling can be related to knowledge, such as mathematical knowledge or knowledge of the history of Brazil, such as the possession of an object such as an electronic device.

On the other hand, the "Scarcity" core drive may represent the difficulty - usually accompanied by a great desire - to obtain something (SOUZA; GREEN; CAGE, 2023). This element is enhanced when aiming to obtain something rare, exclusive or considered unattainable.

It should be noted that, for centuries, thinkers and scientists - including psychology - defended the idea that human beings only evolved and motivated themselves from external influence. In other words, extrinsic motivation was the only credited and source of research, however, nowadays, more and more theorists, especially those who defend cognitive theories, advocate the importance of self-determination (WERBACH; HUNTER, 2012) alluding to the subject as autonomous, proactive and intrinsically motivated. Under this bias, the core drives mentioned are able to relate to human motivation in a positive or negative way, that is, increasing or decreasing motivation.

EXTRINSIC MOTIVATION STRATEGIES

Initially, it is possible to understand extrinsic motivation based on how Ribeiro, Montenegro and Neto (2019) point out: an understanding that not all daily activities provide satisfaction or result from spontaneous choices; however, the need to carry them out is recognized. And as seen earlier, extrinsic motivation strategies involve "the subject's desire to obtain an external reward," such as social recognition and material possessions. (BUSARELLO, 2016, p. 55).

Another point that differentiates extrinsic motivation from intrinsic motivation is the fact that the former has a cause external to the person or task it performs (SHENG; YE, 2009). Zichermann and Cunningham (2011, p. 26) state that "extrinsic motivations are often driven by the world around us, such as the desire to win money or win a spelling beetle." Passing a grade or graduating from school are examples of extrinsic motivation in the educational context.

Gradually, gamification-based learning strategies are finding their place in classrooms, evidenced by the increase in studies on the impacts of these techniques on student motivation as pointed out by Ratinho and Martins (2023). Among the investigations carried out, some focused on



the phenomenon of novelty in gamification, defined by Ratinho and Martins (2023) as a "pattern of high activity during the beginning of a gamified process, followed by a drop in activity after the disappearance of the novelty of gamified activity".

Based on this, the authors Elias and Martins (2023) started a discussion showing that although gamification can have powerful effects in the short term, the loss of novelty can result in the ineffectiveness of the extrinsic reward system, unable to sustain students' intrinsic motivation, even harming their grades.

This scenario is corroborated by a study cited by Elias and Martins (2023) that observed a decrease in student motivation after a gamified experience, and it is crucial to note that this decline does not seem to be exclusively influenced by gamification, but rather by several factors, such as individual differences and self-efficacy beliefs. Therefore, from this, a relevant concern related to gamification arises, since most of the rewards associated with it tend to boost extrinsic motivation, which can result in a more pronounced external orientation of students. This duality of impacts highlights the need for a balanced approach when integrating gamification strategies into the educational context.

In the article by Wu and Santana (2022), the records present the study by Kaynak and Basal (2019) that found that "extrinsic elements of gambling positively influence perceived pleasure." To corroborate the idea, previous studies have recommended that customers get a higher level of enjoyment from accumulating points and badges (Codish and Ravid, 2017). By performing a specific task, the consumer accumulates points, gets identification updates, and finds a sense of euphoria, fun, and pleasure (Denny, 2013; Xi and Hamari, 2019).

Finally, the last article chosen (McLeod et.al, 2017) analyzed, quantitatively, the influence of intrinsic and extrinsic motivation on the engagement and pleasure of individuals during the practice of electronic games. Study participants (McLeod et.al, 2017) expressed that extrinsic motivators play a significant role in increasing engagement with games. When exploring whether the presence of these motivators would positively affect game enjoyment, students indicated a preference for gamification when extrinsic elements, such as badges, leaderboards, and reward systems, were incorporated. This suggests that when using electronic games as a tool to teach electronic health record (EHR) concepts, it is crucial to include such external incentives. Surprisingly, the results also revealed that participants, for the most part, were more extrinsically motivated, highlighting the importance of these elements compared to the simple complexity or fun of the game. Thus, the research emphasized the relevance of carefully considering and integrating extrinsic motivators in the design of electronic games aimed at education.



THE CONTRIBUTION OF PSYCHOLOGY TO GAMIFICATION

The importance of psychology in understanding the psychological processes behind the user's motivations that occur during games is highlighted, three of which according to Busarello (2016):

Cognitive Area	Emotional Area	Social Area
It denotes the autonomy of the individual, since, based on skills and preferences, it is determinant of task choices. In an environment that encourages thinking as in games, there is a complex system of rules that individuals must have to master, and this experience depends on the autonomy of that subject.	It denotes the competence of the individual and focuses primarily on the concepts of success and failure. The game system is based on the principle of increasing the individual's positive feelings. Success in performing tasks should be immediately recognized by individuals.	It denotes the relationship and interaction of individuals during the use of the system. This dimension addresses socialization, collaboration, and competition. However, stimulating competition can generate either constructive or destructive results.

Source: Busarello (2016).

The three areas highlighted by the author demonstrate the importance of stimuli to user engagement, not only for extrinsic motivations but mainly for the internal stimuli of each user. However, it is also understood that intrinsic motivations do not only encompass positive aspects, with the passage of time and the help of other areas such as design, it was possible to manipulate details to provide stimuli to users.

The term "black hat" is associated with dubious ethical practices, and gamification is no exception to this rule. "Black Hat" strategies in gamification involve manipulating psychological vulnerabilities to deceive or pressure users. Techniques such as addictive design, where game elements are created to generate addiction, can have serious implications on users' mental health. There is also the use of deceptive or highly leveled rewards to hold the user's attention, and the use of unfair obstacles and strategies that hinder and activate the user's emotions, the use of emotional triggers, and the excessive collection of data for manipulative purposes are questionable practices that raise ethical concerns.

Black hats are motivators in which the user doesn't know what's going to happen, or is constantly afraid of missing something, or because there are things the user can't have. Even though they are extremely motivating elements, these facts usually lead to a negative feeling about decision-making. (LIMA, Rafael Medeiros de. 2021, p. 27)

"Black Hat" techniques are strong intrinsic motivators in gamification, according to Lima and Reis (2022) these techniques bring the user a feeling of urgency and anxiety, factors that can trigger long-term dependence on the user, anxiety triggers and several negative aspects. It is important to emphasize that there is a growth in the use of these techniques by game creators aiming at benefit and growth, with no concern for the user, for this, it is important to highlight the concern regarding the growth of the use of technologies and games in our current society.



In contrast to "Black Hat" tactics, the "White Hat" approach to gamification focuses on transparency, ethics, and promoting genuine benefits for users. Companies and developers seek to engage users in a healthy way by encouraging intrinsic motivation and providing positive experiences. This approach aims to stimulate creativity, and assist the user in healthy practices. Transparency in the collection and use of data, along with respect for ethical boundaries, are essential characteristics of "White Hat" gamification.

It is necessary to address not only the interaction between gamification and psychology, but also to make room for ethics that may be lacking in the digital age. While the strategies known as "Black Hat" aim to exploit vulnerabilities for gain and are used maliciously, "White Hat" gamification seeks to create positive, ethical and healthy user experiences. It is essential that there is awareness of the psychological aspects involved and that ethical practices are promoted, in order to shape a future where gamification is a constructive and positive tool in the digital society and not a contributor to the increase of psychological disorders.

FINAL THOUGHTS

In view of the above, gamification emerges as an innovative and effective strategy in the contemporary context of learning, boosting student motivation and engagement. The application of this multidisciplinary and technological approach aims to make the learning process more dynamic, attractive and efficient, overcoming challenges associated with monotony and perceived difficulty in certain activities.

By delving deeper into intrinsic and extrinsic motivation strategies, we realize the complexity of this phenomenon. Gamification, by incorporating elements of games in diverse contexts, uses competition, cooperation, and other intrinsic and extrinsic factors to drive participant engagement. The balanced combination of intrinsic and extrinsic motivations is crucial to enhance the motivation and engagement levels of the subjects and provide a more assertive gamification experience.

The contribution of psychology, as evidenced in this study, is fundamental to support motivation strategies in gamification. Understanding the cognitive, emotional, and social dimensions provides a solid theoretical foundation for the design and application of gamified techniques. Autonomy, competence and social interaction are highlighted aspects, showing how gamification can positively influence these areas of experience.

The research reveals that gamification is constantly evolving, being most prominent in areas such as education and healthcare. Initial results point to the need for a balanced approach, considering both short- and long-term impact, especially in the educational context, where initial novelty may be followed by a decrease in the effectiveness of extrinsic rewards.



In short, gamification, anchored in psychological principles, represents a promising tool to optimize the learning process and improve motivation and engagement in various spheres of life. However, it is important to continue researching and refining approaches to maximize the benefits and mitigate potential challenges associated with this innovative strategy.



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