Models of Instructional Design in Gamification

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Gamification allows for the implementation of experiences that simulate the design of (video) games, giving individuals the opportunity to be the protagonists in them. Its inclusion in the educational environment responds to the need to adapt teaching–learning processes to the characteristics of homo videoludens, placing value once again on the role of playful action in the personal development of individuals.

gamification teacher training gamification design frameworks

1. Introduction

The proliferation of educational experiences that propose the implementation of active methodologies in teaching–learning processes has provoked the academic interest of the research community. In relation to gamification, there are numerous practices that introduce, in one way or another, elements of (video) games in educational contexts to increase student motivation and involvement. The interest in studying the implications of gamification processes in the different educational stages, in order to determine their impact and suitability, has led to an increase in scientific publications in recent years. As such, the difficulties that at present still persist in clearly defining what gamification is, a term that is often confused with (video) game-based learning, when associated with its root game or with the concept of fun learning, has promoted a massification of studies in this field.

In an initial study, Alomari et al. [1] analyzed 40 publications related to the promotion of learning in university students after the implementation of gamification techniques between 2016 and 2018. The presence of a series of common strategies is determined and grouped under the acronym PBL (points, badges, and leaderboards) with a presence of 75%, 65%, and 63%, respectively. As evidenced by the authors, these gamification elements allow for the emergence of a controlled competitive environment that leads to an increase in student motivation and participation.

Along the same lines, Rauschenberger et al. [2] developed a systematic review of the term gamification in the field of learning environments, extracting the relationship between dynamics present in the 10 studies analyzed: emotions and progress (relationships, narrative, choices, and restrictions); mechanics: rewards, (opportunities, resource acquisition, and victory states), feedback, and challenges (cooperation, competition, and transactions); and gamification components: badges, avatars, points, rewards, missions, etc.

Elsewhere, Bozkurt and Durak [3] performed a meta-analysis of 208 studies on gamification published between 2008 and 2016. Through it, they highlight those methodologies most commonly used in gamification research.

They also perform a lexical analysis to determine the relationship and reiteration of words in the titles and abstracts of the articles that make up the sample. Gamification is the most used term, related to education, learning, students, training, etc. In a second cluster, the terms game, engagement, social, elements, motivation, experience, behavior, effectiveness, etc., appear. Finally, gamification is related to words such as design, technology, software, online, tools, etc. The study by Zainuddin et al. [4] also addresses issues related to platforms and apps found in the scientific literature on gamification (ClassDojo, ClassBadges, Kahoot!, Duolingo, etc.).

Of interest is the review conducted by Cordero-Brito and Mena [5], representing the evolution of gamification and its influence in the social domain. For this purpose, they analyze a total of 136 articles published between the years 2011 and 2016. The authors establish the temporal trend in publications on gamification, with a considerable increase in recent years. They also identify the most representative model of instructional design, called MDA: mechanics, dynamics, and aesthetics. Finally, the authors establish a list of gamification components and tools and their impact on the motivation of individuals.

Regarding the different educational stages, systematic studies such as that of Fadhli et al. [6] are proposed. Such studies analyze studies published between 2014 and 2018 on the effectiveness of gamification in the acquisition of conceptual, procedural, and attitudinal content in students aged 6 to 10 years, corresponding to primary education. Meanwhile, Pegalajar Palomino [7] identifies the main findings in the scientific literature, from 20 studies published between 2010 and 2019, on the perception of university students towards the implementation of gamification strategies in their teaching–learning processes. Subhash and Cudney [8] also focus their studies on the university setting, attending to the areas of knowledge (computer science, business, science, pedagogy, etc.), the countries of production (Spain in first place, followed by the United States and Germany), the gamification elements employed (badges, feedback, collaboration, levels, narrative, etc.), and the benefits of gamification (motivation, attitude, engagement, enjoyment, etc.) found in 41 articles between 2012 and 2017.

2. Models of Instructional Design in Gamification

The instructional design model with the greatest relevance is the PBL or points, badges, and leaderboards strategy with 35.71%, including variants such as PBL+K and PL. In second place, it see the MDA or mechanics, dynamics & aesthetics architecture, with 28.57% presence. This is followed by Pyramid DMC or dynamics, mechanics and components with 14.28%. With the same percentages (7.14%) are the 6D approach and Learning Tangram. Finally, the Bonk and Dennen model, as well as the social gamification approach, also with the same proportion (3.57%). It should also be noted that the PBL and MDA instructional design models are present in more than 50% of the sample (**Figure 1**).

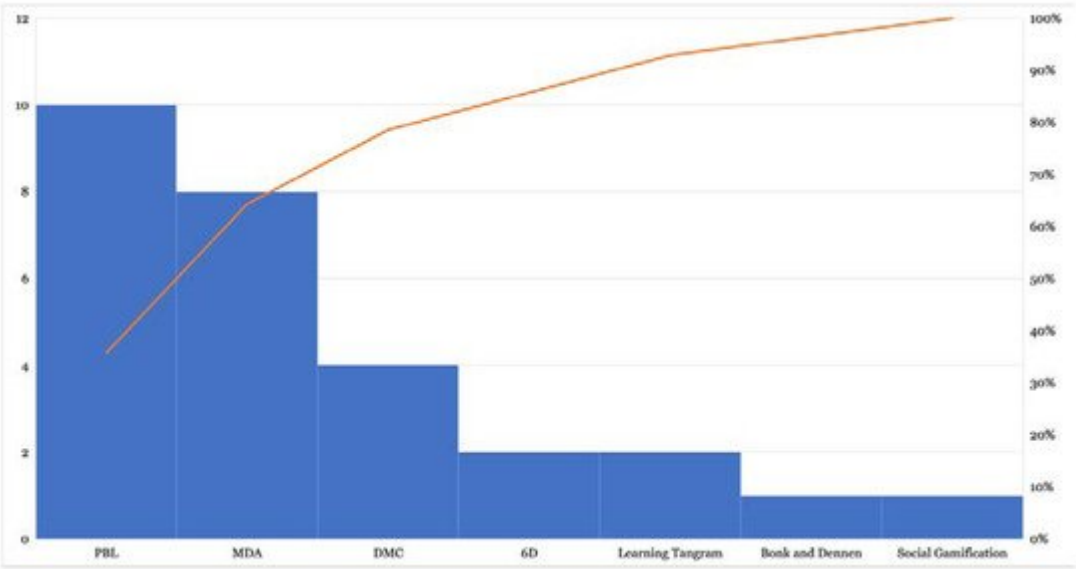

Figure 1. List of instructional design models.

53.57% of the gamification systems present a superficial configuration or thin layer level gamification. 46.43% correspond to deep level gamification designs. In relation to the identified models, it is possible to evidence the relevance of elements that make up the gamified experience, being determinant to assess its effectiveness in relation to design. The PBL strategy is the most representative among surface gamification systems, while the DMA and DMC models are more related to deep gamification designs (**Figure 2**).

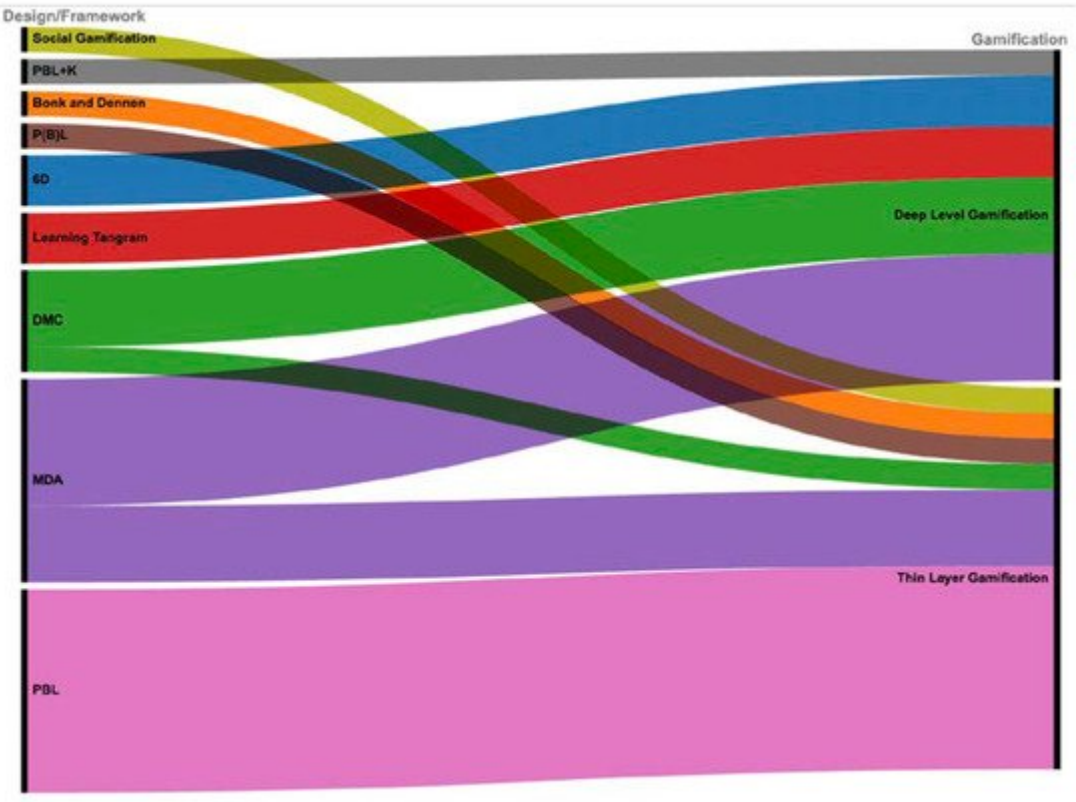

Figure 2. Instructional design models and their relationship with gamification type.

3. Effects of Gamified Practices in the Teaching–learning Process

As can be seen in **Figure 3**, engagement or educational commitment is one of the main implications of gamification in educational practice identified in the sample, with 29.41%. Next, the impact of gamification processes on student motivation is evident (26.47%) through an increase in motivation. Based on the practice of Pérez-López et al. [9], gamification, as a methodological strategy, creates an improvement in student motivation and an increase in their involvement. With the same percentage (11.77%), there are results related to student participation and attitudes, as a consequence of the previous elements. Likewise, an improvement in the students' perception of the knowledge acquired has been identified (8.82%) [10], followed by aspects related to the updating of pedagogical, technological, and conceptual knowledge, as a consequence of ongoing teacher training (5.88%) [11]. Finally, with the same percentage (2.94%), results related to the improvement of communication and academic results of participating students were observed.

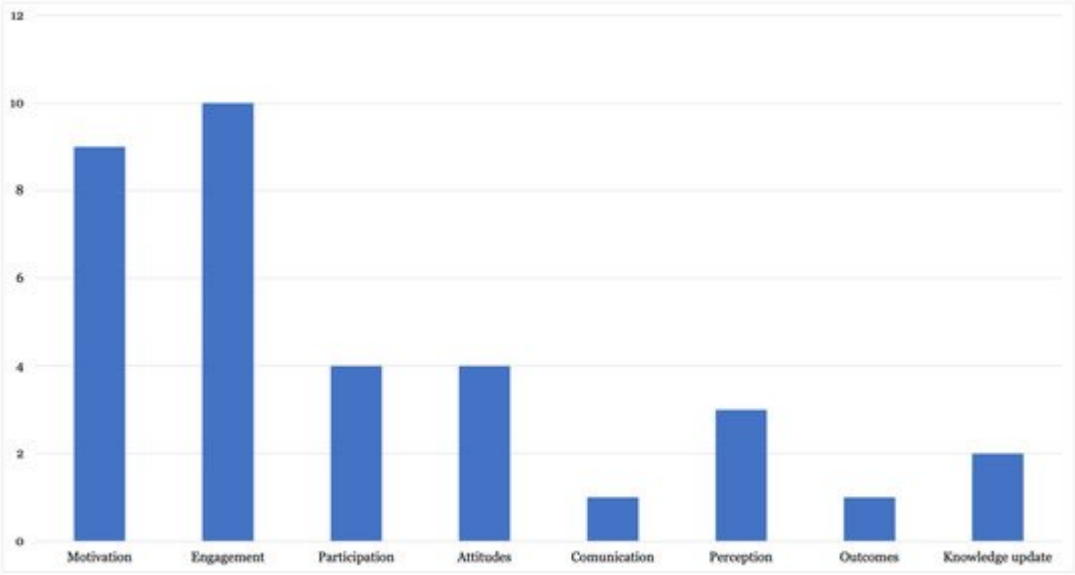

Figure 3. Categories established to analyze the effects of gamified practices.

4. Conclusions

Study has made it possible to identify the main instructional design models for gamification systems. For this purpose, it has been necessary to establish a relationship with elements implemented in the practices proposed, since in many cases the model involved in the design of the gamified practice has not been explicitly established. In this sense, coinciding with the study by Navarro-Mateos et al. [12], there is a general lack of knowledge of the process of gamification systems or specific models of instructional design by teachers, causing the introduction of gamification elements without a specific criterion or without a configuration that has a specific purpose.

The prevalence of PBL, i.e., gamification practices that introduce, in isolation, three components: points, badges and leaderboards. Although other studies [12] dismissed those gamification proposals based on PBL, considering

that gamification “is a more abstract, complex and strategic process that aims to go beyond the use of points, badges and rankings” (p. 512), the reality is that it represents one of the most widely used gamification models in the field of instructional design [1][13][14][15][16]. However, other more complex models have been identified that require a more reflective and elaborate design process, resulting in deep gamification systems, such as the MDA architecture, coinciding with the study conducted by Bozkurt and Durak [3], the Elements Pyramid and the 6D approach.

In relation to the educational implications of gamification in the teaching–learning processes, through the proposals analyzed in the articles that make up the sample, a direct relationship between this methodology and increase in motivation, commitment, participation, and attitudes of the participating students has been evidenced. Conclusions that can also be observed in other studies [5][13][14][12][16], which identify a series of implications of gamification at all educational levels, are those such as improved academic performance and increased student engagement and motivation. Pegalajar Palomino [7] states that, “at the cognitive level, it is worth noting how the practice of gamified learning experiences allows an improvement in the academic performance of students, helping them to maximize learning” (p. 178).

There is an adequate educational approach to gamification requires a deep knowledge of the implications derived from the implementation of this methodology. To this end, it is necessary to assess the importance of instructional design models that allow an adequate development of gamified practices. The interconnection of elements that make up a system of these characteristics requires a process of reflection, planning, and arrangement of its components, avoiding improvisation and arbitrariness.

Educational implications, which aim to go beyond the improvement of students’ academic performance, pursue an increase in motivation, commitment, and positive attitude towards the teaching–learning process itself, through the entertainment and uniqueness provided by gamified practices. It also becomes necessary to implement experiences in the field of teacher training, both in its initial and permanent stage, providing experiential learning that allows teachers to introduce, in their professional development, this methodology in a relevant way, based on their own experience.

References

1. Alomari, I.; Al-Samarraie, H.; Yousef, R. The Role of Gamification Techniques in Promoting Student Learning: A Review and Synthesis. J. Inf. Technol. Educ. Res. 2019, 18, 395–417.
2. Rauschenberger, M.; Willems, A.; Ternieden, M.; Thomaschewski, J. Towards the Use of Gamification Frameworks in Learning Environments. J. Interact. Learn. Res. 2019, 30, 147–165.
3. Bozkurt, A.; Durak, G. A Systematic Review of Gamification Research: In Pursuit of Homo Ludens. Int. J. Game-Based Learn. 2018, 8, 15–33.

4. Zainuddin, Z.; Chu, S.K.W.; Shujahat, M.; Perera, C.J. The impact of gamification on learning and instruction: A systematic review of empirical evidence. Educ. Res. Rev. 2020, 30, 100326.
5. Cordero-Brito, S.; Mena, J. Gamification and Its Application in the Social Environment: A Tool for Shaping Behaviour. J. Inf. Technol. Res. 2020, 13, 58–79.
6. Fadhli, M.; Brick, B.; Setyosari, P.; Ulfa, S.; Kuswandi, D. A meta-analysis of selected studies on the effectiveness of gamification method for children. Int. J. Instr. 2020, 13, 845–854.
7. Pegalajar Palomino, M.C. Implicaciones de la gamificación en Educación Superior: Una revisión sistemática sobre la percepción del estudiante. Rev. Investig. Educ. RIE 2021, 39, 169–188.
8. Subhash, S.; Cudney, E.A. Gamified learning in higher education: A systematic review of the literature. Comput. Hum. Behav. 2018, 87, 192–206.
9. Pérez López, I.; Rivera García, E.; Trigueros Cervantes, C. 12 +1. Feelings of physical education college students towards a gamification proposal: “Game of Thrones: The Anger of the Dragons”. Movimento 2019, 25, e25038.
10. Ortega Ruipérez, B.; Alvarado, A.; Chorro, E.; Cuartero, N. Percepción del alumnado sobre la adquisición de la competencia en creación de contenidos digitales con gamificación. Rev. Educ. Tecnol. 2021, 14, 1–22.
11. Levitt, R.; Piro, J. Game-changer: Operationalizing the common core using webquests and “gamification” in teacher education. Int. J. Web-Based Learn. Teach. Technol. 2014, 9, 53–71.
12. Navarro-Mateos, C.; Pérez-López, I.J.; Marzo, P.F. Gamification in the spanish educational field: A systematic review. Retos 2021, 42, 507–516.
13. Kalogiannakis, M.; Papadakis, S.; Zourmpakis, A.-I. Gamification in science education. A systematic review of the literature. Educ. Sci. 2021, 11, 22.
14. Ekici, M. A systematic review of the use of gamification in flipped learning. Educ. Inf. Technol. 2021, 26, 3327–3346.
15. Klock, A.C.T.; Gasparini, I.; Pimenta, M.S.; Hamari, J. Tailored gamification: A review of literature. Int. J. Hum. Comput. Stud. 2020, 144, 102495.
16. Manzano-León, A.; Camacho-Lazarraga, P.; Guerrero, M.; Guerrero-Puerta, L.; Aguilar-Parra, J.; Trigueros, R.; Alias, A. Between level up and game over: A systematic literature review of gamification in education. Sustain. Switz. 2021, 13, 2247.

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