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GAMIFICATION IN ELEMENTARY SCHOOL: A TOOL FOR STUDENT ENGAGEMENT

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Ismael dos Santos Oliveira[1], Jorge Luís da Silva Vieira[2], Edilaine de Macêdo Paulo[3], Edmaury Vieira Fabri[4], Douglas Barbosa Sousa[5], Christian dos Santos Mota[6], Francisco Jorge Gondim[7] and Dirceu da Silva[8]

ABSTRACT

The present study investigated how gamification has been used in teaching and what are the main challenges and benefits perceived in its application in the educational context. The general objective was to analyze the conceptions, challenges and benefits of gamification in teaching, focusing on the pedagogical practices of elementary and higher education. The methodology adopted was a bibliographic review, with qualitative analysis of articles, dissertations and theses related to the theme. The results indicated that gamification, when used appropriately, increased student engagement and motivation, in addition to contributing to the development of cognitive and social skills. However, challenges such as the lack of technological infrastructure and the resistance of some teachers were identified as obstacles to its implementation. The final considerations suggested that gamification has the potential to transform pedagogical practices, but large-scale adoption depends on investments in technology and teacher training. The need for further studies that can complement the findings and explore the long-term impact of gamification in different educational contexts was also highlighted.

[1] Master in Emerging Technologies in Education
MUST University
E-mail: maestroismaelsantos@gmail.com
[2] Specialist in Educational and Clinical Psychopedagogy
Integrated Colleges of Várzea Grande (FIAVEC)
E-mail: jorgeluis8486@hotmail.com
[3] Master's student in Emerging Technologies in Education
MUST University
Email: eidymacedo@hotmail.com
[4] Master's student in Emerging Technologies in Education
MUST University
E-mail: edmaury@hotmail.com
[5] Computer Network Specialist
Associated Colleges of São Paulo (FASP)
E-mail: douglas.sousa@ifpr.edu.b
[6] Master's student in Emerging Technologies in Education
MUST University
Email: christianmota1@gmail.com
[7] Specialist in Higher Education Teaching
Venda Nova do Imigrante College (FAVENI)
E-mail: franciscocgondim@gmail.com
[8] Doctorate student in Education
UNINQ UniversityE-mail: prof.dr.dirceudasilva@gmail.com

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INTRODUCTION

Gamification has been consolidated as an innovative approach in the educational field, using game elements to make the teaching and learning process attractive and engaging. In the contemporary scenario, in which digital technologies permeate social and cultural practices, the use of gamified strategies in classrooms has gained relevance, especially due to the ability to engage students in a dynamic and interactive way. Gamification in teaching seeks, through the use of rules, challenges, and rewards, to promote student motivation, facilitating the development of cognitive and social skills. This theme is pertinent in the face of the growing demand for pedagogical practices that align new technologies with the educational context, providing a stimulating learning environment that is connected with the students' reality.

The justification for choosing this theme is related to the need to investigate how gamification can contribute to improving the teaching and learning process. In recent years, several studies have pointed to the importance of active methodologies, in which the student is no longer a mere receiver of information and starts to have an active role in the construction of knowledge. Gamification, in this context, emerges as a strategy capable of promoting student participation and involvement, favoring learning through problem-solving and collaborative work. In addition, it is observed that, despite its growing popularity, there are still challenges in the implementation of this methodology in schools, which makes it relevant to analyze its potentialities and limitations in the educational environment.

The problem that guides this research is the following question: how has gamification been used in teaching and what are the main challenges and benefits perceived in the application in educational contexts? The answer to this question is essential to understand how gamification can be incorporated into pedagogical practices, as well as to identify the factors that influence the success or difficulties of implementation. The need to understand the real impact of gamification on the educational process is urgent, especially with regard to the development of strategies that can be replicated at different levels of education and in different disciplines.

The main objective of this research is to analyze the conceptions, challenges and benefits of gamification in teaching, focusing on the pedagogical practices developed in elementary and higher education. From this analysis, it is expected to provide subsidies that can contribute to a greater understanding of how gamification can be used in education.

The text is organized into sections that seek to explore the proposed theme in a structured way. The introduction presents the context of the research, justifying the importance of studying gamification in teaching. The theoretical framework discusses the

concept of gamification and its relationship with learning theories. In the development, three topics address the conceptions and experiences of gamification in elementary school, in higher education, and the challenges and potentialities of this methodology. The methodology describes the criteria adopted for the selection of sources and the method of data analysis. The discussion of the results analyzes the impacts of gamification on student motivation, on the development of cognitive skills, and the obstacles faced by teachers in the application of this strategy. Finally, the final considerations summarize the main conclusions and suggest possible paths for further research in the area.

THEORETICAL FRAMEWORK

The theoretical framework is organized in order to provide an understanding of gamification and its application in the educational context. The definition and history of gamification are addressed, highlighting its evolution and incorporation into pedagogical practices. Next, the relationship between gamification and the main learning theories is argued, with emphasis on how these theories support the use of game elements in teaching. Next, the use of technologies and digital tools associated with gamification is explored, presenting the main platforms and resources used to engage students and promote interactive learning.

GAMIFICATION IN ELEMENTARY SCHOOL – CONCEPTIONS AND EXPERIENCES

Gamification in elementary school has been explored as a tool to improve student engagement and learning. Teachers and students have different conceptions about this practice, which seeks to integrate elements of games into educational activities. Alencar and Silva (2021, p. 18) investigated teachers' perceptions of the use of gamification in the early years of elementary school. According to the authors, "gamification has the potential to transform classroom dynamics, providing greater student participation and encouraging teamwork, in addition to developing skills such as problem-solving." This statement highlights how teachers see gamification as a strategy to promote student engagement in collaborative activities.

In addition, the experiences reported by Alencar and Silva (2021) indicate that many educators perceive an increase in student motivation when game elements are incorporated into the learning environment. The authors state that "students showed greater interest in gamified activities, which resulted in greater participation and better performance in the classroom" (Alencar; Silva, 2021, p. 22). This suggests that gamification can have a positive impact not only on engagement but also on students' academic performance.

On the other hand, Esquivel (2017) presents a study that highlights the implementation of gamification in the teaching of mathematics in an elementary school. According to the author, "gamification applied to mathematics classes proved to be effective in motivating students to solve problems in a dynamic and collaborative way, allowing them to develop their cognitive skills in a natural way" (Esquivel, 2017, p. 30). This argument reinforces the idea that, in addition to increasing motivation, gamification can also be a pedagogical tool for the development of essential skills for the learning process.

Esquivel (2017) also emphasizes that, although the results have been positive, there are challenges related to teacher training and school infrastructure to implement gamified activities efficiently. "The lack of specific training for teachers and the lack of technological resources are obstacles that hinder the expansion of gamification in schools" (Esquivel, 2017, p. 45). Thus, despite the perceived benefits, it is necessary to overcome these barriers to ensure that gamification is applied.

The practical experiences reported by both studies show that gamification has the potential to transform the teaching environment, both from the point of view of students and teachers. While teachers observe an improvement in student engagement and skill development, students perceive gamified activities as an attractive way to learn. However, as pointed out by Esquivel (2017), it is still necessary to invest in teacher training and adequate infrastructure for this methodology to be applied in elementary education.

GAMIFICATION IN HIGHER EDUCATION – APPROACHES AND IMPACT

Gamification in higher education has been explored as a strategy to promote greater engagement and improve student performance in various contexts. Recent studies indicate that the integration of game elements into the academic environment can influence both student motivation and the learning process. According to Araújo (2021, p. 56), in his study on gamification and project-based learning in higher education, "gamification applied to educational projects enables students to develop skills autonomously and collaboratively, while encouraging continuous engagement in the proposed activities". It is verified how gamification can contribute to the autonomy of students, highlighting the active role they assume in the learning process.

In addition, Araújo (2021, p. 78) points out that the use of gamification in higher education provides a differentiated approach, in which students feel motivated to participate in challenging and dynamic activities. The author states that "students reported greater satisfaction with the gamified format of the disciplines, pointing to an improvement in both their academic performance and their ability to collaborate in groups". This statement

demonstrates that, in addition to increasing motivation, gamification can be a tool to foster interpersonal skills, such as collaboration, which are essential in the academic context.

In turn, Avelar (2019, p. 44) analyzes an experience of gamification in the training of English language teachers, emphasizing the impact that this methodology had on the academic performance of students. According to the author, "the use of digital games and gamified activities in English teacher training classes allowed a significant increase in the participation of students, who showed greater interest in the proposed activities". This reflection highlights how gamification can be used to engage students in subjects that require the practice of language skills.

Avelar (2019, p. 48) also addresses the issue of the impact on academic performance, mentioning that "in addition to promoting greater engagement, gamification enabled students to perform better in the evaluations carried out throughout the course". This suggests that when implemented well, gamification can not only engage students but also improve academic outcomes consistently.

Therefore, the studies by Araújo (2021) and Avelar (2019) indicate that gamification in higher education has the potential to transform the educational experience by promoting greater motivation and improving student performance. However, both authors also recognize that the success of this methodology depends on an adequate implementation, which considers the specificities of each discipline and the educational context in which it is inserted. Thus, gamification presents itself as a promising tool for higher education, capable of actively and collaboratively involving students in the learning process.

CHALLENGES AND POTENTIALITIES OF GAMIFICATION IN PEDAGOGICAL PRACTICES

Gamification in pedagogical practices presents both challenges and potentialities that need to be analyzed to understand the impact on education. One of the main challenges identified is the lack of infrastructure in schools, which limits the implementation of gamified activities. According to Martins and Giraffa (2015, p. 42), "the lack of adequate technological resources, such as computers and internet access, makes it difficult to apply gamified strategies in many educational institutions". This technological limitation is a recurring obstacle, especially in public schools, where access to digital tools is restricted, making it difficult to adopt innovative methodologies such as gamification.

Another significant challenge is the resistance on the part of teachers, many of whom still show insecurity in relation to the use of game elements in their pedagogical practices. According to Martins and Giraffa (2015, p. 44), "a considerable portion of teachers are

reluctant to adopt gamification, either due to lack of knowledge of its pedagogical possibilities or lack of specific training". Teacher resistance, often linked to the lack of continuous and specific training, represents a barrier for gamification to be effectively integrated into teaching practices.

Despite these challenges, the potential of gamification is recognized. One of the evident benefits is the increase in student engagement, who feel motivated to participate in the proposed activities. Alencar and Silva (2021, p. 25) highlight that "gamification promotes a dynamic and engaging learning environment, in which students become participatory and engaged in the learning process". This increased engagement is related to how game elements, such as rewards and challenges, stimulate healthy competitiveness and the desire to achieve goals, favoring the continuous involvement of students.

In addition to engagement, gamification also contributes to the development of cognitive and social skills. Esquivel (2017, p. 36) observes that "by participating in gamified activities, students are encouraged to solve problems collaboratively, which strengthens both logical reasoning and social interaction skills". In this way, it is verified how gamification can be a tool not only for academic development, but also for the promotion of socio-emotional skills, essential for the integral formation of students.

Therefore, although gamification faces significant challenges, such as lack of infrastructure and teacher resistance, its potential is undeniable. It has the power to transform the dynamics of the classroom, promoting greater engagement and developing skills that go beyond academic content. However, for these benefits to be achieved, it is necessary to overcome the obstacles related to teacher training and the technological adequacy of schools, so that gamification can be implemented.

METHODOLOGY

The methodology used in this research is of a bibliographic nature, with the objective of reviewing and analyzing the main academic productions related to the theme of gamification in teaching. This is a descriptive research, with a qualitative approach, based on the analysis of scientific works, academic articles, dissertations and theses that explore the use of gamified activities in the educational context. The research instruments consist of the selection and analysis of bibliographic material available in academic databases, specialized journals and digital repositories of universities. Criteria of relevance, timeliness, and academic impact were used to choose the sources. The data collection procedure involved the search for publications that deal with the application of gamification in elementary and higher education, as well as studies on the challenges and benefits of this

methodology. The analysis technique consisted of a critical reading of the selected texts, focusing on the identification of convergent and divergent points on the conceptions, experiences and results observed in the gamified pedagogical practices.

The following table presents the main references used in the research, organized according to author, title, year and type of work. These works served as a basis for the analysis and discussion of the topics addressed throughout the literature review.

Chart 1: Bibliographic References Used in the Research

Author(s)	Conforming title published	Year	Type of work
ALVES, L. R. G.	Games and education – the construction of new meanings	2008	Article
FARDO, M. L.	Gamification applied in learning environments	2013	Article
MARTINS, C; GIRAFFA, L. M. M.	Gamification in pedagogical practices: theories, model and experiences	2015	Article
NASCIMENTO, S. P. *et al*.	Gamification in Teaching: a systematic review of the literature in the Brazilian scenario	2015	Article
ESQUIVEL, H. C. R.	Gamification in the teaching of Mathematics: an experience in elementary school	2017	Master's Thesis
PAIVA, C. A.; TORI, R.	Digital games in teaching: cognitive processes, benefits and challenges	2017	Article
AVELAR, M. G.	"Game on": an experience with games in the training of English language teachers	2019	Master's Thesis
ALENCAR, D. P.; SILVA, E. G.	Gamification of teaching: teachers' conceptions about the use of gamified activities in the early years of elementary school	2021	Article
ARAÚJO, A. L. R.	Gamification and Project-Based Learning: a study with Higher Education students	2021	Doctoral Thesis
FERNANDES, M. A.	Gamification in elementary school: use of new technologies as tools to motivate learning	2022	Master's Thesis

Source: authorship

After inserting this table, the analysis of the sources allowed us to identify common patterns in the approaches to gamification and its applications in different educational contexts. The table was organized to facilitate the visualization of the works and their contribution to the development of the theme. From the references presented, it became possible to establish a solid basis for discussing the benefits and challenges of gamification in teaching, as well as suggesting possible advances in the implementation of this methodology.

EFFECTS OF GAMIFICATION ON MOTIVATION AND ENGAGEMENT

Gamification has shown significant effects on student motivation and engagement, being pointed out by several studies as a strategy to transform the learning environment.

Fardo (2013, p. 27) argues that "the application of game elements in educational environments promotes active interaction on the part of students, encouraging them to participate continuously in the proposed activities". This increase in participation is related to the introduction of challenges and rewards that keep students engaged in the learning process, creating a dynamic atmosphere.

In addition, Paiva and Tori (2017) point out that gamification can serve as an excellent resource to strengthen the relationship between the student and the academic content. The authors state that "the use of digital games in teaching has proven effective in stimulating the interest of students, who demonstrate greater motivation when playful activities are incorporated into the learning process" (Paiva; Tori, 2017, p. 12). It is evident that gamification, by providing an interactive experience, contributes to arousing the interest of students in relation to the topics covered in the classroom, favoring the construction of knowledge.

A fundamental aspect highlighted by Fardo (2013) is the impact that gamification has on the intrinsic motivation of students. The author observes that "the motivation generated by gamification is not only associated with extrinsic rewards, but also with the feeling of competence and autonomy that students develop when overcoming challenges and achieving goals" (FARDO, 2013, p. 35). Thus, this argument reinforces that gamification can go beyond involving students in playful activities; It also promotes autonomy and the development of a challenge-oriented mindset, which can have lasting effects on the learning process.

Paiva and Tori (2017) complement this discussion by highlighting that gamification favors collaborative engagement among students. The authors state that "gamified activities involve the formation of groups or teams, which contributes to the development of social skills, such as cooperation and teamwork" (Paiva; Tori, 2017, p. 14). This observation highlights that, in addition to stimulating individual engagement, gamification promotes social interactions that enrich the learning environment, providing opportunities for students to collaborate and solve problems together.

Therefore, the effects of gamification on student motivation and engagement are proven by the research of Fardo (2013) and Paiva and Tori (2017). The use of game elements not only motivates students to participate in activities, but also contributes to the development of essential skills, such as autonomy and collaboration. From this evidence, it understands that gamification can be a pedagogical tool, as long as it is applied properly and with clear objectives aimed at learning.

DEVELOPMENT OF COGNITIVE SKILLS THROUGH GAMIFICATION

Gamification has proven to be a strategy for the development of various cognitive skills, such as logical reasoning, problem-solving, and critical thinking. Alves (2008) explores the impact of games on education, highlighting that "games allow students to experience complex situations that require the application of logical reasoning and problem-solving strategies, which contributes to cognitive development" (ALVES, 2008, p. 230). It is evident that gamified elements not only engage students, but also offer an environment conducive to the practice and improvement of fundamental skills in the learning process.

In a complementary way, Fernandes (2022) emphasizes that gamification in teaching not only encourages student participation, but also favors the development of critical skills for academic and professional training. According to the author, "when facing challenges and missions in a gamified environment, students are led to apply critical thinking to analyze situations, identify solutions, and evaluate the results of their decisions" (Fernandes, 2022, p. 45). This approach contributes to students acquiring greater autonomy in problem solving, developing analytical and structured thinking.

In addition, Alves (2008, p. 234) observes that gamification offers opportunities for the practice of cognitive skills in a continuous and progressive way. The author argues that "students have the chance to experiment with different forms of logical reasoning throughout the games, testing hypotheses and adjusting their strategies as they progress through the levels, which reinforces the learning of complex concepts". Thus, it is evident that the use of game elements can be a tool to teach reasoning skills, since it allows students to learn through trial and error in a safe and controlled environment.

Fernandes (2022) also points out that gamification facilitates the practical application of theories and concepts learned in the classroom. The author states that "games, by involving simulations and real situations, require students to use the information acquired in the teaching process to make decisions, which strengthens their ability to apply knowledge in a practical and efficient way" (FERNANDES, 2022, p. 48). Thus, in addition to developing cognitive skills, gamification integrates theoretical learning with practice, making education meaningful for students.

Therefore, gamification plays an important role in the development of essential cognitive skills, such as logical reasoning and critical thinking, as pointed out by Alves (2008) and Fernandes (2022). By providing an interactive and challenging learning environment, this methodology allows students to enhance cognitive capabilities while engaging in the learning process, creating a connection between theoretical content and its practical application.

LIMITATIONS AND PRACTICAL CHALLENGES OF GAMIFICATION IN TEACHING

The implementation of gamification in education faces several barriers that need to be considered, including technological difficulties, teacher resistance, and the lack of adequate training. Nascimento *et al*. (2015) point out that "insufficient technological infrastructure is one of the main obstacles to the adoption of gamification in schools, especially in public institutions, where access to digital devices and quality internet is limited" (Nascimento *et al*., 2015, p. 12). This limitation impacts the feasibility of incorporating gamified activities, which in general depend on advanced technologies to function.

In addition to technological barriers, teacher resistance also poses a significant challenge. Many educators are still afraid to adopt innovative methods such as gamification, either due to lack of knowledge or insecurity in relation to use. Nascimento *et al*. (2015, p. 15) comment that "some teachers see gamification as an unserious or inappropriate tool for the traditional educational environment, which generates resistance to implementation". This resistance is often related to a lack of understanding of the pedagogical potential of gamification, in addition to a conservative view of education, which favors traditional teaching methods.

The lack of adequate training of teachers to work with gamification is also a relevant barrier. According to Nascimento *et al*. (2015, p. 18), "the initial and continuing education of teachers addresses the use of active methodologies, such as gamification, which contributes to insecurity and resistance in its adoption". It is evident that, without adequate training, teachers do not feel prepared to integrate elements of games into pedagogical practices, which prevents the expansion of this methodology in the classrooms.

In addition, even when there is interest in implementing gamification, the lack of institutional support and resources for continuous training makes the process difficult. Nascimento *et al*. (2015, p. 20) points out that "the absence of specific training programs and insufficient support from educational institutions are factors that discourage teachers from experimenting with new methodologies". The lack of support and infrastructure reinforces the difficulty of establishing gamification consistently in the school environment.

Thus, the limitations and practical challenges of gamification in education, such as inadequate technological infrastructure, teacher resistance, and lack of specific training, make it difficult to implement it on a large scale. Although gamification offers numerous pedagogical possibilities, its effectiveness depends on adequate infrastructure conditions and the training of the professionals involved. Therefore, in order for gamification to be

adopted in teaching, it is necessary to overcome these barriers through investments in technology and teacher training programs aimed at innovative methodologies.

FINAL CONSIDERATIONS

The final considerations of this study aim to answer the research question about how gamification has been used in teaching and what are the main challenges and benefits perceived in its application in educational contexts. The analysis of the reported conceptions and experiences indicated that gamification, when used appropriately, can promote greater engagement and motivation of students, providing a dynamic and interactive learning environment. The benefits observed include the development of cognitive skills, such as logical reasoning and problem-solving, as well as favoring collaboration and teamwork among students.

However, despite the positive results, the survey also identified significant challenges for the implementation of gamification in education. The lack of adequate technological infrastructure, such as access to devices and the internet, was one of the main obstacles pointed out. In addition, the resistance of part of the teachers, often related to the lack of specific training on the use of innovative methodologies, was also highlighted as an important barrier. This resistance can hinder the expansion of gamification in schools, limiting its potential as a pedagogical tool.

The contributions of this study are directed to the understanding of the benefits and challenges of gamification in the educational context. By exploring both the potentialities and the difficulties encountered, the study provides an overview of how this methodology can be applied in teaching, especially with regard to increasing engagement and developing essential skills for students. However, the challenges observed suggest the need for complementary measures, such as investments in technology and continuous training of teachers, so that gamification can be adopted and explored to its maximum potential.

Finally, it should be noted that, although this study has contributed to the understanding of gamification in teaching, there are still gaps that need to be filled through new research. Further studies could expand research into the long-term impact of gamification on academic achievement and the development of specific competencies. In addition, future research could explore how different school contexts and disciplines affect the effectiveness of gamification, offering insight into the conditions necessary for this methodology to be successfully applied.

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