Application of Gamification in Elementary Education: Benefits and Limitations

Matheus Heitor Saft[1]
Dr. Thaísa Leal da Silva[2]
Dr. Patrícia Dias[3]
Dr. Lauro André Ribeiro[4] (corresponding author)

[1] School of Computer Science, ATITUS Educação, Rua Senador Pinheiro, 304, Passo Fundo/RS, 99070-220, Brazil. E-mail: matheussaft@outlook.com.

[2] Stricto Sensu Postgraduate Program in Architecture and Urbanism (PPGARQ), ATITUS Educação, Passo Fundo/RS, 99070-220, Brazil. E-mail: thaisa.silva@atitus.edu.br.

[3] Management Department at Sobey Business School, Saint Mary's University, 923 Robie Street, Halifax, Nova Scotia, Canada. E-mail: patricia.dias@smu.ca;

[4] Stricto Sensu Postgraduate Program in Architecture and Urbanism (PPGARQ), ATITUS Educação, Rua Senador Pinheiro, 304, Passo Fundo/RS, 99070-220, Brazil and INESCC, Portugal. E-mail: lauro.ribeiro@atitus.edu.br;

Abstract

Gamification has proven itself as an innovative strategy for promoting engagement and motivation in the educational context, especially in Elementary Education. This study aimed to analyze the applicability of gamification in elementary education, focusing on its potential and possible limitations, particularly in the Brazilian context. To achieve this goal, a bibliographic review was conducted using established databases seeking relevant books, articles, theses, and institutional websites. The results indicated that gamification, when based on learning theories and structured with appropriate elements, significantly contributes to increasing students' motivation, active participation, and meaningful learning. The analysis also revealed that the effectiveness of gamification depends on the conscious integration of game elements with pedagogical objectives, as well as the need for teacher training to ensure its proper implementation. It was concluded that gamification represents a promising tool for transforming educational practices in Elementary Education, provided it is applied in a planned and reflective manner.

Keywords: Gamification; Elementary Education; Meaningful Learning; Pedagogical Strategies; Motivation.

1. Introduction

Recent studies in the field of education have indicated a shift in pedagogical approaches and teaching practices, aiming to increase student engagement and enhance the learning process (Hamari et al., 2016; Whitley et al., 2017). The use of gamification in educational environments fosters self-sufficiency and enhances student engagement in learning activities. This approach, by associating challenges and rewards with the teaching-learning process, provides a more interactive and collaborative experience that meets students' motivational needs (Looyestyn et al., 2017).

Furthermore, Sailer and Homner (2020) highlight that gamification can contribute to the satisfaction of students' basic psychological needs, such as autonomy, competence, and relatedness. The authors emphasize that meeting these needs is essential for student engagement and intrinsic motivation, thereby making the teaching-learning process more meaningful and effective.

However, although several studies point to advantages associated with gamification, such as increased engagement and motivation (Japiassu & Rached, 2020; Fernandes, 2024), gaps persist regarding the most effective forms of its application in Elementary Education. Fernandes's (2024) analysis notes that, without proper planning, this approach can be reduced to a playful activity without connection to educational objectives. Similarly, Zanette (2023) warns of the possible negative effects of poorly applied strategies, such as excessive emphasis on rankings and competitions, which can generate feelings of frustration or demotivation in some students. These observations reinforce the need for gamification to be contextualized, considering the characteristics and demands of each class, as highlighted by Criado (2018) and Martins (2023), when addressing the importance of planning and adapting gamified elements.

Given this, the general objective of this study is to analyze the applicability of gamification in elementary education, focusing on its potential and possible limitations, with a focus on studies developed in the Brazilian context.

The justification for this study is based on the relevance of gamification as a pedagogical strategy aligned with the contemporary demands of basic education. By bringing together contributions from authors such as Ogawa et al. (2015), Oliveira and Pimentel (2023), Narciso et al. (2024), Di Bartolomeo et al. (2025) and Barcellos (2022), this work aims to offer a critical view on the topic, contributing to the training of teachers and managers. In addition, it seeks to promote a deeper understanding of the limits and possibilities of gamification in the context of Brazilian Elementary Education, to contribute to more effective practices through critical analysis of strategies used, observed benefits, and risks associated with its application, especially in the teaching of subjects such as mathematics and science.

2. Methodology

As this is theoretical research, no experimental activities or practical interventions will be made. The methodology is based on a bibliographic survey and documentary analysis of studies related to gamification, especially in the Brazilian educational context, prioritizing investigations carried out in Elementary Education.

2.1 Bibliographic Survey

To present the theoretical basis of the study, a bibliographic survey was carried out in scientific databases, Google Scholar, and SciELO. The survey included articles, dissertations, theses, bibliographic reviews, and reports that address the effects of gamification on student motivation, engagement, and performance. Priority was given to studies that address gamification in elementary education, with an emphasis on national productions, to reflect the reality of Brazilian basic education.

2.2 Methodological Procedures

The methodological procedures of this study follow a content analysis and theoretical categorization approach of the data collected in the literature review. The steps performed are listed below:

- Search Sources: Academic databases such as Google Scholar and SciELO were consulted. These databases were chosen due to their comprehensiveness and diversity of relevant publications in the areas of education and technologies applied to teaching.
- Keywords and Search Strategy: The search was carried out using keywords such as Gamification; Elementary Education; Meaningful Learning; Pedagogical Strategies; School Motivation. Boolean operators, such as "AND" and "OR", were also used to combine terms and refine the results. Articles in Portuguese and, when relevant, also in English were included.

- Inclusion and Exclusion Criteria: The inclusion criteria considered studies published in the last ten years, focused on the application of gamification in elementary education and its impacts on student engagement and performance. Articles not related to the educational context or that deal with gamification in other stages of education were excluded.
- Study Selection: After the initial search, the results were analyzed in three phases: (1) reading titles and abstracts to eliminate irrelevant studies; (2) full reading of articles that passed the initial screening; and (3) final evaluation based on inclusion and exclusion criteria to select the studies that comprised the theoretical framework.

After applying the methodological procedures described, it was possible to organize and classify the materials found according to relevance and suitability to the theme. During the survey, a variety of publications such as academic articles, dissertations, theses, and educational reports were identified. The predominant themes involved the use of gamification in teaching subjects such as mathematics and science, as well as approaches aimed at developing socio-emotional skills. Most of the studies came from databases such as SciELO and Google Scholar, reflecting a concentration of publications in national journals focused on education and technologies applied to teaching. After the screening and exclusion stages, only materials that were directly relevant to the focus of this work remained, especially those related to Elementary Education and the Brazilian context.

Table 1 - Gamification in Brazilian Elementary Education

Author/year	Contexts	Method	Tool/Tech
Martins (2023)	Public school in Rio Grande do Sul; Elementary School II science classes	Case Study	App Math Master
Criado (2018)	Elementary School I classes	Pedagogical Project	Creating Game
Barcellos (2022)	Classroom use of Kahoot in regular activities	Game Development	Kahoot

This filtering allowed the construction of a consistent theoretical basis for the analysis developed in the following chapters.

3. Theoretical Framework

This section presents the concepts, theories, and applications related to gamification in the educational context, with an emphasis on its contributions to elementary education. The objective is to provide a solid theoretical basis for understanding how gamification can impact student engagement and learning.

The content covered in this section constitutes the theoretical framework necessary to support the understanding of the topic, being distinct from the studies described in Chapter 4, which present works directly related to the scope and objectives of the present analysis.

3.1 Concept of Gamification

Gamification is defined as the use of game elements in non-game contexts, being a widely used technique in educational environments to motivate students. Ogawa et al. (2015) state that gamification applies game design techniques and employs game mechanics and game-oriented thinking to enrich diverse contexts not normally related to games. The primary purpose of these techniques is to make learning more engaging, interactive, and dynamic.

Within the scope of this work, which is dedicated to analyzing the application of gamification in Elementary Education, it is essential to understand how this concept fits into the school context. Basic education, especially in Elementary Education, currently faces the challenge of capturing and maintaining the attention of a generation of students immersed in digital technologies and accustomed to fast and interactive stimuli. In this scenario, gamification emerges as an innovative response to contemporary demands, offering methodological alternatives that seek to reconfigure traditional pedagogical practices. Its introduction into the school environment, therefore, aims to meet the need to develop new strategies that align teaching processes with the expectations and profiles of 21st-century students (Ogawa et al., 2015).

The concept of gamification, although relatively recent, has already been established in academic literature approaches. According to Gee (2003), the intrinsic characteristics of games significantly contribute to the learning process, such as identity construction, problem-solving, and progression through increasing challenge levels. These elements can be transposed to the educational environment through gamification. Similarly, Oliveira and Pimentel (2023) reinforce that gamification, by employing game strategies in teaching, provides a more favorable environment for active, collaborative, and meaningful learning. Both authors emphasize that the effectiveness of gamification lies not only in the inclusion of games in the classroom but in the conscious use of their mechanics and dynamics to transform the way students interact with knowledge.

Although there is general agreement regarding the benefits of gamification, there are relevant theoretical divergences about its definitions and applications. While authors like Gee (2003) emphasize the importance of an approach that preserves the complexity and critical potential of games, avoiding reducing them to instruments of mere content repetition, other authors, such as Oliveira and Pimentel (2023), focus on the motivating capacity of gamification, even in simpler applications focused on specific tasks. This divergence reflects an underlying tension between deeper conceptions of gamification, which view games as spaces for integral development, and more pragmatic approaches, which use game elements only as tools for immediate stimulus to student participation.

The limitations and criticisms related to gamification also deserve attention. Ogawa et al. (2015) affirm that the simple introduction of game elements, without careful integration with pedagogical objectives, can result in fragmented practices that do not necessarily lead to meaningful learning. These criticisms highlight the necessity of a planned and reflective implementation of gamification, taking into account the characteristics of students, learning objectives to be achieved, and particularities of the educational context.

Connecting these theories and perspectives to the central problem of this study reinforces the importance of investigating the strategic application of gamification in Elementary Education. Understanding the concept of gamification critically and contextually is essential to analyze how this methodology can be used not only to increase student motivation but to effectively contribute to the construction of knowledge and the development of fundamental skills. Thus, this work seeks to advance beyond understanding gamification as a simple stimulus tool, proposing its analysis as a potentially transformative pedagogical strategy, aligned with the needs of contemporary education (Gee, 2003; Oliveira & Pimentel, 2023).

3.2. Learning Theories Applied to Gamification

The relationship between learning theories and gamification is essential for understanding how game elements can be meaningfully incorporated into the educational process. The use of gamification in teaching is not limited to the inclusion of playful resources but involves the adoption of pedagogical principles that support active, meaningful, and motivating learning practices. Learning theories provide the conceptual basis for understanding how gamified activities can stimulate cognitive, affective, and social processes, favoring not only content retention but also the development of skills such as autonomy, collaboration, and critical thinking (Sailer & Homner, 2020).

Within the scope of this study, which aims to investigate strategies and benefits of gamification in Elementary Education, it is fundamental to situate gamification considering contemporary pedagogical approaches. In this context, gamification appears as a tool that enhances these approaches by promoting challenging, collaborative, and feedback-rich environments, characteristics that favor meaningful learning and the internalization of new knowledge (Looyestyn et al., 2017).

Positive effects of gamification are mediated by intrinsic motivational factors, such as the sense of competence, autonomy, and interpersonal relationships (Sailer and Homner, 2020). Gamification, when well applied, can enhance these factors, aligning with the principles of Self-Determination Theory, which argues that human motivation is driven by the satisfaction of basic psychological needs. Complementarily, Rodrigues et al. (2025) emphasize that meaningful learning occurs when new content relates substantively and non-arbitrarily to the student's prior knowledge, and that gamification can be a catalyst for this process by making learning more contextualized and relevant.

Despite the convergence regarding gamification's ability to enhance active learning, there are divergences regarding the depth of this methodology's impact on the development of higher cognitive skills. While Looyestyn et al. (2017) highlight in their systematic review that most studies point to benefits in increasing student participation and motivation, some authors question whether gamification, by itself, can promote more complex and lasting learning. Santos and Lima (2024) observe that, in many practical applications, gamification tends to focus excessively on extrinsic rewards, such as points and medals, which can compromise the development of student autonomy and critical reflection.

These criticisms reveal important limitations in the implementation of gamification in education. Rodrigues et al. (2025) point out that, without proper alignment between pedagogical objectives and chosen game elements, there is a risk of transforming the learning environment into a merely competitive or mechanical space, where the focus shifts from knowledge construction to the simple attainment of rewards. Santos and Lima (2024) also emphasize that poorly planned gamification can reinforce inequalities among students by favoring those with greater initial skills to the detriment of those who need more support, which contradicts the principles of educational equity.

Connecting these discussions to the problem of this study highlights the need to understand gamification not as an automatic solution to the challenges of basic education, but as a strategy that, based on solid learning theories, can positively transform elementary education. The critical analysis of theoretical perspectives on gamification reinforces the importance of its conscious and planned use, aimed at promoting meaningful learning and the integral development of students, in line with the objectives of inclusive and quality education (Sailer & Homner, 2020; Rodrigues et al., 2025; Santos & Lima, 2024).

3.3. Gamification Elements in Elementary Education

Gamification, when incorporated into the educational context, uses various game elements to make the teaching-learning process more engaging and motivating. Among the most common elements are points, medals, rankings, challenges, levels, avatars, and rewards. These components aim to stimulate student engagement, providing a more interactive and meaningful experience (Sailer & Homner, 2020).

Points are frequently used to quantify student performance in activities, functioning as an immediate feedback system. Medals, in turn, represent specific achievements and aim to recognize individual progress. Rankings promote comparison between participants' performances, stimulating competitiveness and the desire to excel. Challenges are tasks with different difficulty levels that encourage reasoning and problem-solving, while levels allow students to perceive their evolution and advance according to their performance.

Avatars offer students the possibility of visual representation in the gamified environment, contributing to the personalization of the experience and increasing the sense of belonging. Rewards, which can be symbolic or material, function as extrinsic incentives for participation and good performance. However, it is important to note that the use of these elements must be aligned with pedagogical objectives, preventing them from becoming mere mechanisms of decontextualized reward.

According to Sailer and Homner (2020), the appropriate choice of gamification elements is crucial for the effectiveness of this methodology. They argue that elements such as immediate feedback, visible progression, and clear goals are more effective in promoting learning than those based solely on competition. This perspective is corroborated by Santos and Lima (2024), who state that the indiscriminate use of rankings can generate anxiety in students and promote an environment of exclusion, especially for those with learning difficulties.

In addition to the positive aspects, it is important to consider the risks associated with the inappropriate application of gamified elements. For example, the excessive use of public rankings can generate anxiety or frustration in students with learning difficulties, compromising their engagement. The effectiveness of gamification depends directly on the teacher's sensitivity to adapt the elements to the characteristics of the class, avoiding distortions and ensuring the inclusion of all students in the process.

In this sense, Rodrigues et al. (2025) affirm that the teacher's role is fundamental in the selection and mediation of gamified elements, ensuring that they are used in a balanced and intentional way. This includes considering the specific characteristics of the class, the learning objectives, and the diversity of student profiles. Gamification, when applied with clear planning and pedagogical purpose, has the potential to transform the educational experience, promoting engagement, skill development, and the construction of knowledge in a meaningful way.

Thus, the choice and appropriate combination of gamification elements must be carried out based on a careful analysis of the educational context, student needs, and pedagogical objectives. The conscious application of these elements contributes to the creation of more motivating, dynamic, and inclusive learning environments, reinforcing the importance of gamification as an innovative pedagogical strategy in Elementary Education.

3.4. Benefits and Limitations of Gamification in Education

According to Narciso et al. (2024), the application of gamified activities in elementary education demonstrates great potential to make learning more engaging, interactive, and compatible with the demands of contemporary students. Studies indicate that gamification contributes to greater content retention, improves student performance in assessments, and favors the development of essential skills, such as cooperation, critical thinking, and problem-solving ability.

Within the scope of this work, which aims to analyze strategies and benefits of gamification in Elementary Education, the discussion about its positive impacts is central. The Elementary Education stage is characterized by the consolidation of basic competencies and the strengthening of socio-emotional skills, which makes the use of active methodologies that arouse student interest and favor their effective participation in school activities even more relevant. Japiassu and Rached (2020) emphasize that gamification can create more dynamic, collaborative, and challenging educational environments, contributing to overcoming the limitations imposed by traditional teaching methods and promoting more meaningful learning.

The theoretical perspectives on the benefits of gamification are broadly favorable. Preihs and Sombrio (2023), in their review on the application of gamification in mathematics teaching, identified that the use of game elements not only increases student motivation but also favors the development of logical reasoning and concentration ability. Similarly, Almeida (2015) points out that gamification, by providing clear goals, immediate feedback, and symbolic rewards, stimulates self-regulation of learning and a sense of competence, factors that are directly related to improved academic performance. These authors converge on the idea that gamification is not limited to making classes more fun but can promote effective advances in learning and school engagement.

Despite the predominance of positive perspectives, there are divergences regarding the depth of gamification's benefits in the educational process. While Di Bartolomeo et al. (2015) argue that gamification has a transformative potential by awakening students' enchantment with learning and stimulating creativity, Fernandes (2024) warns of the risk that the motivation generated by game elements may be merely superficial and temporary, without producing lasting changes in student behavior. This divergence reveals the need for gamified practices to be integrated into consistent pedagogical projects, whose ultimate goal is not only to increase participation but to consolidate meaningful learning.

Criticisms and limitations of gamification also deserve careful consideration. Narciso et al. (2024) highlight that, although gamification can be a powerful ally in promoting student interest, its effectiveness depends on the quality of implementation and the suitability of gamified elements to the needs of the class. Japiassu and Rached (2020) complement this view by pointing out that the lack of teacher training for the adequate use of gamification can compromise the intended results, transforming the strategy into a mere reproduction of playful practices without pedagogical intentionality. Furthermore, when applied generically, gamification runs the risk of reinforcing inequalities among students, benefiting those with greater autonomy or familiarity with technology, and discouraging those who face more difficulties, especially when comparison mechanisms such as public rankings or competitive rewards are used.

These limitations reinforce the idea that gamification, to be effective, must be carefully planned and contextualized. It is the teacher's role to make intentional choices of game elements, aligning them with pedagogical objectives, the class profile, and the content to be worked on. Teacher mediation is fundamental to ensure that the benefits of gamification are realized equitably, promoting the participation and development of all students, and not just the most motivated or skilled.

Connecting the discussion about the benefits of gamification to the central problem of this work reinforces the importance of analyzing its application critically and strategically in Elementary Education. From the recognition of its potentials and limitations, it becomes possible to elaborate pedagogical proposals that use gamification not only as a motivational resource but as an effective tool for the construction of lasting learning, the development of socio-emotional competencies, and the promotion of a more innovative and inclusive education (Preihs & Sombrio, 2023; Di Bartolomeo et al., 2015; Fernandes, 2024).

4. Related research

This section presents previous studies that address the application of gamification in Elementary Education and are directly related to the objectives of this research. These works were selected for dealing with practical experiences or relevant theoretical analyses on the use of gamified strategies in school environments, allowing a parallel to be established between the results obtained by these authors and the findings of this bibliographic review. The selection of studies prioritized publications that dialogue with the reality of Brazilian basic education and contribute to understanding the limits and potential of gamification in the teaching-learning process.

Martins (2023), in her study on the use of gamification in science classes in Elementary School II in a public school in Rio Grande do Sul, demonstrates how digital games can increase student participation and improve the quality of learning. The project involved the use of a gamified virtual environment with progressive challenges. The author reports that students showed greater scientific curiosity, increased collaborative work, and more confidence in problem-solving. Martins also highlights that the teacher's active mediation was essential to ensure that the gamified elements were aligned with the curricular content and the needs of the class.

In the study by Japiassu and Rached (2020), the authors evaluated the implementation of a gamified platform in public schools in Bahia, with students from the 4th to 6th grades. The objective was to verify the impacts on student engagement, academic performance, and participation. The results were positive, with an increase in attendance, interest, and academic performance. A central aspect of the study is the emphasis on pedagogical intentionality: for gamification to be effective, it must be integrated into didactic planning and guided by clear objectives, avoiding the risk of being merely a playful activity without a formative function.

Criado (2018) investigated the development of socio-emotional skills through gamification in Elementary School I classes. The author proposed a sequence of gamified playful-educational activities, with challenges based on narratives and collaborative goals. The study concluded that students began to demonstrate more empathy, self-control, respect, and willingness to work in groups. Criado argues that student protagonism, stimulated by games, is a powerful resource for building affective bonds and for the integral formation of students, provided that the teacher acts as a facilitator and guide of the process.

The study by Preihs and Sombrio (2023) presents an integrative review on the application of gamification in mathematics teaching, gathering research conducted between 2016 and 2022 in Brazilian schools. The authors observed that gamified elements — such as scoring, levels, and rewards — help reduce student resistance to the subject and strengthen logical reasoning and concentration. They also point out that the most expressive results occurred in contexts where gamification was associated with active methodologies, such as the flipped classroom. The general conclusion of the study is that gamification, when well applied, not only motivates but also improves learning.

Narciso et al. (2024) conducted a field study with 5th-grade students in a school in the interior of Maranhão. A gamified didactic sequence was applied in mathematics, using digital games, internal rankings, and weekly challenges. The focus was on content such as operations and problem-solving. The authors found advances in both student participation and performance, especially among those who previously showed low self-esteem. The study also highlights the need for continuous teacher training for the critical and effective use of gamification.

Rodrigues et al. (2025) present an interdisciplinary experience in public schools in Goiás, involving missions and symbolic rewards integrated into the regular curriculum. The proposal included challenges linked to the areas of Portuguese, science, and geography, with the use of narratives and scoring systems. The study showed that students felt more motivated, actively participated in the activities, and began to demonstrate greater autonomy. The authors reinforce the

importance of aligning pedagogical objectives with the chosen game elements, in addition to adapting tasks to the school's reality and the students' profiles.

Finally, Oliveira and Pimentel (2023) explore the potential of gamification for school inclusion. The study was developed with 6th-grade classes in Recife, focusing on students with learning difficulties. Gamified activities were adapted with adjustable levels of complexity and personalized feedback. The research demonstrated that the approach contributed to increased self-esteem, cooperation, and student involvement. The authors reinforce that gamification, when well planned, can be an inclusive tool sensitive to classroom diversity.

Table 2 - Gamification in Brazilian Schools: Results and Insights

Categories	Authors	Gamification Insights
Participation	**Martins (2023),** Japiassu & Rached (2020), Narciso et al. (2024), Rodrigues et al. (2025), Barcellos (2022)	Encourages active **involvement** through interactive and goal-oriented activities.
Academic Performance	Japiassu & Rached (2020), Narciso et al. (2024)	**Enhances learning outcomes** and attendance when linked to curriculum.
Autonomy	Rodrigues et al. (2025), **Criado (2018)**	Promotes **independent learning** and student ownership.
Scientific Curiosity	**Martins (2023),** Preihs & Sombrio (2023)	Stimulates exploration and **problem-solving** in science learning.
Socio-Emotional Skills	**Criado (2018)**, Oliveira & Pimentel (2023)	Builds **empathy, cooperation, and emotional regulation.**
Self-Esteem	Narciso et al. (2024), Oliveira & Pimentel (2023)	Supports **confidence**, especially in struggling students.
Engagement	**Barcellos (2022),** Japiassu & Rached (2020), Fernandes (2024) (critical)	**Captures attention** through rewards, stories, and competition.
Pedagogical Alignment	**Martins (2023)**, Fernandes (2024), Oliveira & Pimentel (2023), Rodrigues et al. (2025)	Requires thoughtful **integration** into learning objectives and student needs.

These related works provide a solid basis for understanding how gamification has been applied in different school contexts and what the main observed effects are. The joint analysis of these experiences allows reflection on current practices, identification of points of attention, and guidance for future proposals for the conscious, planned, and aligned use of gamification with the needs of Elementary Education.

5. Discussion

The analysis of the studies presented throughout this research allows for identifying patterns and trends in the use of gamification in Elementary Education. The results generally point to significant benefits related to increased student motivation, engagement, and performance. In

different contexts and areas of knowledge, gamification has shown potential to make classes more dynamic, participatory, and aligned with students' interests.

Pedagogical intentionality stands out as an essential factor for the success of gamified practices. The simple insertion of game elements, such as rankings or scoring, does not guarantee a positive impact on the learning process. For gamification to achieve its objectives, it must be integrated into didactic planning, articulated with curricular content, and adapted to the needs of the class. Without this care, there is a risk that the activity will become merely recreational, without promoting real advances in student development.

The teacher's role is central to this process. Martins (2023) highlights that teacher mediation was decisive for the success of using the Math Master application, whose structure included progressive challenges, cumulative scoring, and a reward system. The experience resulted in improved student performance in mathematics, but it was only effective because there was alignment between gamification elements and pedagogical objectives. Criado (2018), when proposing that 9th-grade students create mathematical games for 5th-grade students, observed that immediate feedback, collaboration among students, and involvement with the content favored the construction of responsibilities and empathy among participants.

Another relevant study is by Barcellos (2022), who analyzed the use of Kahoot in regular classroom activities. The research showed that student engagement significantly increased when elements such as timed questions, dynamic ranking, and symbolic rewards were introduced. However, the author warns that the teacher needs to ensure that the focus remains on learning, and not just the competitive aspect.

Among the analyzed studies, four gamification elements stand out as the most used: symbolic rewards (points, medals, and badges), progression through levels, storytelling (narratives that contextualize the content), and immediate feedback. Each of these elements, when applied with clear purpose, favors students' intrinsic motivation, allowing them to advance at their own pace and establish more meaningful relationships with the content.

These findings are also observed in the work of Rodrigues et al. (2025), who highlight the autonomy and involvement of students when participating in gamified projects integrated into the curriculum. Preihs and Sombrio (2023), in turn, show that the use of playful elements in mathematics can reduce student resistance and strengthen skills such as logical reasoning and concentration. Narciso et al. (2024) reinforce this perspective by demonstrating improvements in student performance and self-esteem after the application of a gamified didactic sequence.

However, studies also warn of important limitations. Fernandes (2024) highlights that the motivation generated by games can be superficial and temporary, especially when gamified elements are not integrated into a broader pedagogical project. Japiassu and Rached (2020) point out that the absence of planning and teacher training can lead to an inadequate application of gamification, emptying its potential. Oliveira and Pimentel (2023) add that, in inclusive contexts, the lack of adaptation of challenges and rewards can accentuate inequalities and exclude students with difficulties.

Criado (2018) reinforces that the construction of gamified environments must respect classroom diversity and seek the development of socio-emotional competencies. When gamification

is applied sensitively and personalized, it can promote values such as empathy, persistence, and cooperation. Barcellos (2022) also emphasizes that the positive results of using Kahoot were only perceived because there was planning and connection with the class content.

Thus, the discussion of the results allows us to state that gamification has great potential to transform pedagogical practices in Elementary Education, but its application must be well-founded, contextualized, and conscious. Pedagogical intentionality and the active role of the teacher are decisive for game elements to truly contribute to the academic and socio-emotional development of students.

6. Conclusions

The general objective of the research was partially achieved, since it was possible to carry out a critical and well-founded analysis of the application of gamification in Elementary Education, based on current and relevant theoretical studies. Even so, it is recognized that the in-depth description focused on a limited number of works, which restricts the generalization of the results. Despite this, the data obtained from the review allowed identifying recurring strategies, the most used gamified elements, and observed effects in different educational contexts.

The main contribution of this work is to highlight the importance of the conscious and planned use of gamification as a pedagogical strategy, with a focus on the Brazilian context. From the analysis of the reviewed studies, it was possible to observe that, when applied with intentionality, gamification can favor not only student engagement and motivation but also the development of cognitive and socio-emotional competencies essential for integral formation in Elementary Education.

Although the results point to positive effects of gamification, criticisms were also observed regarding the superficiality of some applications, the dependence on extrinsic rewards, and the lack of teacher training for the adequate use of the methodology. These aspects indicate that the success of gamification is directly linked to its integration with pedagogical objectives, teacher mediation, and the adaptation of strategies to the class profile.

As a recommendation for future work, the realization of field studies involving the practical implementation of gamified didactic sequences is proposed, especially in public schools. It would also be relevant to investigate comparatively which gamification structures present better results in terms of learning and inclusion. In addition, it is suggested to expand investigations into the impact of gamification on students' socio-emotional development and their relationship with the learning process throughout the early and late elementary school years.

It is concluded that gamification represents a promising tool for the transformation of educational practices in Elementary Education, provided that its application is conducted critically, planned, and aligned with the school's pedagogical principles. More than entertaining, gamification can teach meaningfully, as long as games and their elements serve learning.

REFERENCES

Almeida, R. G. (2015). O aumento do engajamento no aprendizado através da gamificação do ensino. **Seminário Mídias & Educação**, Colégio Pedro II. Retrieved from http://cp2.g12.br/ojs

Barcellos, A. F. N. (2022). **Kahoot!: uma intervenção pedagógica para o ensino de Matemática nos anos finais do Ensino Fundamental** [Master's thesis]. Universidade Federal de Santa Maria.

Criado, L. L. (2018). **Um estudo sobre o uso da gamificação nos anos iniciais do ensino fundamental** [Undergraduate thesis]. Universidade de Taubaté.

Di Bartolomeo, R., Stahl, F. H., & Elias, D. C. (2015). A Gamificação Como Estratégia Para o Treinamento e Desenvolvimento. **Revista Científica Hermes**, 14, 71-90. Retrieved from https://www.redalyc.org/pdf/4776/477647161005.pdf

Fernandes, J. (2024). Gamificação no ensino fundamental: estimulando o interesse e a aprendizagem significativa. **Caderno Pedagógico**, 20(3), 45-58. Retrieved from https://ojs.studiespublicacoes.com.br/ojs/index.php/cadped/article/download/5369/3636/14308

Gee, J. P. (2003). **What video games have to teach us about learning and literacy**. Palgrave Macmillan.

Hamari, J., Shernoff, D.J., Rowe, E., Coller, B., Asbell-Clarke, J., & Edwards, T. (2016). Challenging games help students learn: An empirical study on engagement, flow and immersion in game-based learning. **Computers in Human Behavior**, 54: 170–179. https://doi.org/10.1016/j.chb.2015.07.045

Japiassu, R. B., & Rached, C. D. A. (2020). A Gamificação no Processo de Ensino-Aprendizagem: Uma Revisão Integrativa. **Revista Educação em Foco**, 10(2), 45-58. Retrieved from https://portal.unisepe.com.br/unifia/wp-content/uploads/sites/10001/2020/03/Renato-Revista-Educac_a_o-em-Foco.pdf

Looyestyn, J., Kernot, J., Boshoff, K., Ryan, J., Edney, S., & Maher, C. (2017). Does gamification increase engagement with online programs? A systematic review. **PLoS ONE**, 12(3), e0173403. https://doi.org/10.1371/journal.pone.0173403

Martins, A. B. M. (2023). **Gamificação no Ensino da Matemática: Um Estudo de Caso** [Undergraduate thesis]. Universidade Federal do Pará.

Narciso, R., Fernandes, A. B., Azevedo, C. M. S., Guimarães, C. D., Silva, F. A., Burin, G. R. E., Alves, I. F., Vergara, M. V. M., Carvalho, M. G. M., & Cruz, V. A. T. (2024). Gamificação no ensino fundamental: Estimulando o interesse e a participação dos alunos. **Revista Ibero-Americana de Humanidades, Ciências e Educação**, 10(3), 313-324. https://doi.org/10.51891/rease.v10i3.13050

Ogawa, A. N., Magalhães, G. G., Klock, A. C. T., & Gasparini, I. (2015). Análise sobre a gamificação em ambientes educacionais. **CINTED-UFRGS: Novas Tecnologias na Educação**, 13(2). Retrieved from https://core.ac.uk/display/303973564

Oliveira, M., & Pimentel, R. (2023). Gamificação na Educação Básica: uma revisão sistemática do estado da arte. In **Anais do Simpósio Brasileiro de Informática na Educação** (pp. 1-10). SBC. Retrieved from https://sol.sbc.org.br/index.php/sbie/article/view/26708

Preihs, F. R. N., & Sombrio, G. S. (2023). Ferramentas pedagógicas: uma revisão bibliográfica sobre a utilização da gamificação no ensino da matemática no ensino fundamental. **Revista de Educação Matemática**, 15(3), 20-35.

Rodrigues, S. R. M., Gomes, M. G. G., Lacerda, A. G., Silva, A. P. S., Santos, C. A. S., Barbosa, D. S., Gouveia, E. A. L. S., Silva, J. K., & Sousa, L. A. S. (2025). Gamificação e aprendizagem significativa: projetos interativos no ensino fundamental. **Cuadernos de Educación y Desarrollo**, 17(4), 1-23.

Sailer, M., & Homner, L. (2020). The Gamification of Learning: A Meta analysis. **Educational Psychology Review**, 32, 77-112. https://doi.org/10.1007/s10648-019-09498-w

Santos, A., & Lima, C. (2024). Gamificação como estratégia de ensino: uma abordagem prática no Ensino Fundamental. **Revista Brasileira de Educação**, 30(91), 1-15.

Whitley, M., Walsh, D., Hayden, L., & Gould, D. (2017). Narratives of Experiential Learning: Students' Engagement in a Physical Activity-Based Service-Learning Course. **Journal of Teaching in Physical Education**; 1–29. https://doi.org/10.1123/jtpe.2016-0141

Zanette, G. H. (2023). **Gamificação no ensino de Matemática: uma jornada para o desenvolvimento de competências no 9º ano do ensino fundamental** [Master's thesis]. Universidade Federal de Santa Catarina.