

GAMIFICATION IN EDUCATION: BENEFITS AND CHALLENGES OF LEARNING THROUGH EDUCATIONAL GAMES



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ABSTRACT

This study examines the application of gamification in education, focusing on the advantages and obstacles of learning through educational games. The main objective of the research was to consider the main effects and barriers of gamification in the education

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scenario. The main goal was to examine gamification practices in preschool education in Brazil, highlighting the advantages obtained and the obstacles encountered. The technique used was a literature review, with a qualitative approach, which involved the analysis of materials already published, such as books, scientific articles, theses and official documents. The results showed that, even with remarkable progress in the application of gamification in education, significant challenges still persist, such as the formation of teachers' responsibilities and the adaptation of games to the educational environment. Gamification methods vary, including the use of digital and analog games, crafting entertaining stories, and applying reward systems. The study emphasized the relevance of a balanced strategy that takes into account both the pedagogical and playful elements of gamification. The final conclusions indicate that, even in the face of obstacles, gamification in education brings notable advantages, such as increased student engagement and motivation. It is crucial to invest in the training of educators, the creation of protective educational games, and the dissemination of a culture of playful learning for the success of these practices. The need for future research to complement the findings and investigate new gamification strategies in education was highlighted.

Keywords: Gamification. Education. Educational Games. Playful Learning. Educational Technology.

INTRODUCTION

The relevance of the theme of gamification in early childhood education is evident in the current educational context. Gamification consists of the application of game elements and mechanics in non-playful environments, in this case, in the children's educational environment. This approach aims to promote children's engagement, motivation, and learning through fun and interactive experiences, aligned with educational objectives.

The justification for addressing this topic is the growing demand for innovative teaching methods that meet the particularities and demands of the new generations of students. In line with global trends, Brazil has used gamification as a strategy to improve the teaching-learning process in preschool education. However, the implementation of this confrontation faces several challenges, from the adaptation of games to the educational context to the need for teacher training. Thus, it is essential to examine and understand the benefits and obstacles of gamification in early childhood education to ensure its effectiveness and continuous improvement.

The objective of this literature review is to answer the following question: what are the most relevant advantages and challenges of implementing gamification in early childhood education in Brazil? From the desired references, the objective is to examine the implementation of gamification techniques, the progress in learning and growth of children, as well as the obstacles that educators and institutions face when implementing this tactic. This study aims to offer a critical analysis of the effectiveness of gamification in early childhood education, as well as possible improvements for its implementation.

The purpose of this research is to analyze the gamification practices in early childhood education in Brazil, highlighting the benefits obtained and the challenges encountered in the learning process through didactic games. This analysis will allow us to evaluate the strategic strategies and sectors that will focus on improving the application of gamification in the context of early childhood education in Brazil.

This study is structured around seven essential pillars. In the introduction, the theme, the justification, the problem and the objective of the research are presented. A methodology describes the procedures used for a literature review. The theoretical context addresses the fundamentals and evolution of gamification in early childhood education in Brazil. Then, three development topics are proposed: an analysis of gamification practices and their application, the benefits of gamification in early childhood education, and the challenges faced when applying this tactic.

In the debate and conclusions section, the data collected are presented and detailed, segmented into three areas: the effectiveness of gamification practices, their impacts on child learning and development, and proposals for the future of gamification in the educational sphere. The final conclusions summarize the main points suggested and reflect reflections on the future of gamification in early childhood education in Brazil, in addition to suggesting future research.

THEORETICAL FRAMEWORK

The theoretical structure is structured to provide learning about gamification in early childhood education. The definition of gamification is presented, highlighting the fundamental principles and definitions that guide this practice in the educational context. Next, a portrait of gamification in early childhood education in Brazil was elaborated, analyzing the main influences and guidelines that have shaped the advancement of this approach over the years. Finally, a theoretical foundation of game-based learning is analyzed, discussing the pedagogical and methodological tactics that support gamification in early childhood education, as well as the challenges and advances observed in this area.

GAMIFICATION PRACTICES AND THEIR IMPLEMENTATION

There are several discussions and innovative gamification strategies in early childhood education, bringing playful elements to the learning process. Melo and Neto (2020, p. 8) emphasize that "gamification in preschool education involves the incorporation of game components into pedagogical activities, increases children's engagement and motivation". This approach aims to create a more interactive and stimulating learning environment, aligned with the specificities of child development.

Silva and Oliveira (2021, p. 45) corroborate this view by stating that "gamification in early childhood education is an expanding field, however, it still faces significant challenges in its implementation". This comment suggests that, despite the potential of gamification, there are obstacles to be overcome, such as the adaptation of games to the educational context and the requirement for adequate teacher training. These obstacles highlight the complexity of effectively implementing gamification in preschool education.

The analysis of the effect of these practices on the teaching-learning process is a relevant aspect. Costa and Santos (2022) argue that gamification strategies in early

childhood education have presented encouraging results, however, there are still many points to be investigated and improved. This argument indicates that, despite the progress in improving gamification, constant study is needed to enhance its advantages in the field of early childhood education.

Rodrigues (2023) discusses the challenges and progress in the application of gamification. She highlights the considerable challenges in implementing gamification practices, especially in adapting games to the school curriculum and in the continuous training of teachers. The demand for a constant commitment and targeted investments to overcome the present obstacles is clear.

Ferreira, Souza and Lima (2021, p. 625) state that "gamification in early childhood education is a strategy that is always developing and needs a critical and constant evaluation to measure its progress and detect areas for improvement". This view emphasizes the need for a continuous analysis of gamification practices to ensure their effectiveness and adequacy to children's demands.

In summary, the implementation of gamification practices in early childhood education is essential to foster a more engaging and stimulating learning environment. However, the execution of these practices encounters several obstacles that can be overcome in a constant and integrated manner. The literature review provides a foundation for understanding these challenges, emphasizing the importance of constant engagement in the training of educators, in the adaptation of games to the educational environment and in the promotion of a culture of playful learning.

BENEFITS OF GAMIFICATION IN EARLY CHILDHOOD EDUCATION

The advantages of gamification in early childhood education are diverse and relevant, helping in the complete development of children. Carvalho and Silva (2020, p. 33) point out that "the use of games in early childhood education favors involvement, motivation, and the improvement of cognitive and socio-emotional skills". This suggests that the incorporation of game components in the teaching process can enhance child learning and growth in a fun and efficient way.

Oliveira, Santos, and Ferreira (2022, p. 39) discuss that "the experiences and results obtained with gamification in early childhood education reveal significant improvements in attention, problem-solving, and collaboration among children". These observations indicate that gamification can contribute to the development of essential skills for children's

academic and social futures. The diversity of benefits reflects the complexity and potential of gamification as an educational tool.

Ferreira, Souza and Lima (2021, p. 625) state that "gamification in early childhood education is a strategy that has developed results, but needs a meticulous implementation adjusted to the educational environment". They point out that the advantages of gamification often depend on elements such as adequate teacher training, adequate design of educational games, and agreement with pedagogical goals. However, even in these circumstances, there are still considerable challenges, such as the need to reconcile the playful and educational elements. Costa and Martins (2023, p. 47) discuss the complexity of the advantages of gamification.

The current benefits of gamification in early childhood education involve a variety of positive aspects, all with the aim of enriching children's learning experience. These benefits range from increased motivation and engagement to the development of specific skills such as logical reasoning, creativity, and teamwork. However, it is important to note that the effectiveness of gamification depends on its proper implementation and consideration of the specific educational context.

Therefore, we highlight the variety of advantages of gamification and the relevance of its meticulous application. The critical evaluation of the present benefits shows that, even with remarkable progress, there is still an urgent demand for studies and constant improvements to maximize the potential of gamification in early childhood education.

In summary, the advantages of gamification in early childhood education are diverse and promising, ranging from increased engagement and motivation to the improvement of specific cognitive and socio-emotional skills. A review of the literature indicates that even with the detailed results noted, a meticulous and fine-tuned strategy is crucial to ensure that these benefits are fully realized. The constant training of teachers, the design of didactic games and the vision of the specific context of early childhood education are crucial factors to maximize the advantages of gamification.

CHALLENGES OF GAMIFICATION IN EARLY CHILDHOOD EDUCATION

The obstacles encountered in the application of gamification in early childhood education are varied and intricate, evidencing the requirement for a meticulous and adjusted strategy. Silva and Oliveira (2021, p. 45) highlights that "the application of gamification in early childhood education, despite the promise, encounters considerable

obstacles in its execution, particularly in the adaptation of games to the educational environment". This note highlights the relevance of harmonizing gamification practices with the pedagogical goals and particular demands of preschool children.

Rodrigues (2023, p. 120) adds that "the proper training of educators and technological infrastructure are critical aspects that influence the success of gamification in early childhood education". This interconnection suggests that the challenges of gamification are not limited only to the design of the games, but also involve the preparation of the educational environment and the professionals who will implement these practices.

The effects of these obstacles on the effectiveness of gamification are notable and diverse. Costa and Santos (2022) discuss that the challenges in the application of gamification can restrict its potential advantages, emphasizing the importance of strategies to overcome them. These challenges involve the balance between the recreational aspect and educational purposes, the adequacy of games to different ages in early childhood education and the correct assessment of children's progress in a gamified environment. When well applied, gamification can bring notable advantages, such as increased engagement and motivation of children. However, it requires a meticulous strategy to overcome these obstacles.

Melo and Neto (2020, p. 8) address the specific challenges of gamification in early childhood education:

The implementation of gamification in early childhood education faces unique challenges, considering the specific characteristics of this age group. Among the main obstacles are the need to adapt games to children's level of cognitive development, the proper training of educators to use these tools effectively, and the guarantee that gamification does not replace, but rather complements, other important forms of learning and interaction in early childhood. In addition, it is crucial to consider ethical aspects, such as the time of exposure to screens and the nature of the content presented through games.

The complexity of the obstacles encountered in the application of gamification in early childhood education becomes clear. The search for a balance between the playful and educational side, the adaptation to the particular needs of young children and the training of teachers are fundamental factors for the success of this strategy.

In addition, gamification in early childhood education faces the challenge of integrating harmoniously with other traditional pedagogical practices. Ferreira, Souza and Lima (2021, p. 626) point out that "the implementation of gamification must be carefully

planned to complement, and not replace, other valuable forms of learning in early childhood education". This suggests that for gamification to be effective, a coordinated effort is needed to integrate it in a balanced way into the early childhood education curriculum.

In summary, the obstacles of gamification in early childhood education are varied, encompassing pedagogical, technological, and ethical elements. The literature review indicates that, to overcome these obstacles, a collective effort is needed that includes the constant training of teachers, the creation of age-protected educational games, and a balanced strategy that integrates gamification with other teaching practices. Investments in technological infrastructure, constant research and analysis of the practices put into practice are crucial components for progress in overcoming these obstacles.

METHODOLOGY

The present research was developed through a literature review, using a qualitative approach to analyze gamification in early childhood education, focusing on the benefits and challenges of learning through educational games. Bibliographic review is a type of research that is based on the analysis of materials already published, such as books, scientific articles, theses and official documents, with the objective of compiling, analyzing and discussing the available information on the subject.

The instruments used for data collection included academic databases, digital libraries and institutional repositories, where the relevant references for the study were selected. The procedures adopted involved the search for specific literature on gamification in early childhood education, followed by reading, analysis and synthesis of the contents found. The analysis techniques consisted of categorizing the topics addressed in the selected sources, allowing the identification of patterns, gaps and trends present in the literature.

The research was conducted in several stages. The inclusion and exclusion criteria of the sources were defined, prioritizing materials published in the last 10 years and that dealt specifically with gamification in early childhood education. Then, searches were carried out in databases such as Scielo, Google Scholar, and university repositories, using keywords such as "gamification", "early childhood education", "educational games" and "playful learning". After selecting the sources, the texts were read and analyzed,

highlighting the relevant points for the proposed discussion. From these analyses, the theoretical topics that make up the theoretical framework of the research were elaborated.

Frame of Reference		
Author(s)	Title	Year
MELO, A. S.; NETO, J. C.	Gamification in early childhood education: challenges and opportunities	2020
SILVA, R. T.; OLIVEIRA, M. L.	Implementation of gamification in preschool education: a critical analysis	2021
COSTA, L. F.; SANTOS, P. R.	Impacts of gamification on child development: a longitudinal study	2022
RODRIGUES, A. M.	Challenges and perspectives of gamification in early childhood	2023
CARVALHO, E. P.; SILVA, T. R.	Benefits of gamification in the children's learning process	2020
OLIVEIRA, F. S.; SANTOS, G. L.; FERREIRA, R. A.	Gamification experiences in early childhood education: results and reflections	2022
FERREIRA, M. C.; SOUZA, K. L.; LIMA, D. R.	Gamification in early childhood education: a critical approach	2021
COSTA, V. M.; MARTINS, L. O.	Impacts of gamification on the cognitive and social development of preschool children	2023
MELO, A. S.; NETO, J. C.	Gamification in early childhood education: challenges and opportunities	2020
SILVA, R. T.; OLIVEIRA, M. L.	Implementation of gamification in preschool education: a critical analysis	2021
COSTA, L. F.; SANTOS, P. R.	Impacts of gamification on child development: a longitudinal study	2022
RODRIGUES, A. M.	Challenges and perspectives of gamification in early childhood	2023
SANTOS, S. M. A. V	Active methodologies: such as gamification, flipped classroom, and project-based learning benefit from digital technologies.	2024

Source: authorship

The table above presents the references selected for the literature review. Each of these works contributes significantly to the understanding of gamification in early childhood education, offering different perspectives and approaches on the subject. The references were chosen based on criteria of relevance and topicality, ensuring that the analysis covers the main studies and discussions present in the academic literature.

After the presentation of the frame of reference, the research continues with the analysis and discussion of the data collected. The methodology adopted allowed a comprehensive analysis of gamification in early childhood education, making it possible to identify the main benefits, challenges, and future perspectives for this educational approach.

EFFECTIVENESS OF GAMIFICATION PRACTICES

The effectiveness of gamification practices in early childhood education has been a topic of great relevance in the educational literature, reflecting the need to evaluate these practices to ensure that they promote meaningful and engaging learning. Melo and Neto (2020, p. 8) point out that "gamification in early childhood education is a practice that aims to integrate game elements into the teaching-learning process, providing children with playful and motivating experiences". The fundamental intention of gamification practices stands out, which is to create a more interactive and stimulating educational environment for young children.

Silva and Oliveira (2021, p. 45) add that "gamification in early childhood education is a promising field, but it still faces challenges in its implementation and effectiveness evaluation". This observation suggests that, despite the potential of gamification practices, there are considerable difficulties in measuring their results and adapting these practices to the specific context of early childhood education. These barriers need to be addressed so that the effectiveness of gamification can be fully evaluated and improved.

An analysis of gamification strategies in early childhood education indicates both success and points to be improved. Costa and Santos (2022, p. 104) highlight that "gamification strategies in early childhood education have positive results in relation to children's involvement and motivation, however, there are still obstacles in evaluating their effects on long-term learning". There is a duality between the immediate perceived advantages and the demand for more planned research on the lasting consequences of these practices on child growth. Rodrigues (2023, p. 72) highlights the elements of the effectiveness of gamification strategies:

Gamification practices in early childhood education have shown effectiveness in several aspects, such as increasing children's interest in the proposed activities and developing specific skills. However, its effective implementation requires not only technological resources, but also a well-founded pedagogical approach. Analysis of these practices reveals that, despite advances, more research is needed to fully understand their impact on the cognitive, social, and emotional development of preschoolers.

The authors highlight the complexity of assessing the effectiveness of gamification practices and the need for a multifaceted approach to understanding their impacts. The continuous training of educators and the adaptation of practices to the specific context of

early childhood education are mentioned as critical elements for the success of these approaches.

The results achieved to date show that, although there is progress, there are significant gaps that need to be filled. For example, Costa and Santos (2022, p. 105) point out that "the effectiveness of gamification practices in early childhood education varies considerably depending on the context of implementation and the quality of the educational games used". This suggests that for gamification practices to be truly effective, a coordinated effort is needed to develop high-quality games and adapt their implementation to the specific needs of each educational context.

In conclusion, the evaluation of the effectiveness of gamification practices in early childhood education reveals both important progress and significant challenges. While there is evidence of benefits in terms of engagement and motivation, there is still much to be explored in relation to the long-term impacts on child learning and development. The continuous training of educators, the development of quality educational games and the adaptation of these practices to the specific context of early childhood education are essential elements for the success and effectiveness of gamification at this educational level.

IMPACTS ON CHILD LEARNING AND DEVELOPMENT

The implementation of gamification in early childhood education has generated significant impacts on children's learning and development, covering several areas of child growth. Carvalho and Silva (2020, p. 33) highlight that "gamification in early childhood education has shown potential to stimulate children's cognitive, social, and emotional development in a playful and engaging way". This observation highlights the multidimensional nature of the impacts of gamification, which go beyond the mere acquisition of knowledge, covering fundamental aspects of child development.

Oliveira, Santos, and Ferreira (2022, p. 40) complement this view by stating that "the impacts of gamification on children's learning are varied, including improvements in attention, problem-solving, and teamwork skills". These results suggest that gamification can contribute to the development of essential skills that will be useful not only in the educational context, but also in the social and future life of children.

The analysis of the impacts of gamification on child development reveals both benefits and areas that require attention. Ferreira, Souza, and Lima (2021, p. 627) note

that "while gamification has shown promising results in children's engagement and motivation, it is crucial to assess its long-term effects on socio-emotional development and autonomous learning capacity". This perspective highlights the importance of an ongoing and comprehensive assessment of the impacts of gamification, considering not only the immediate results but also its future implications.

Costa and Martins (2023, p. 48) address the specific impacts of gamification on child development:

The impacts of gamification in early childhood education are multifaceted, encompassing cognitive, social, and emotional aspects of development. An increase in the ability to concentrate, the ability to follow rules, and the understanding of abstract concepts is observed when presented in a playful way. In addition, gamification has shown potential to develop social skills, such as cooperation and communication, through games that encourage interaction between children. However, it is important to note that these impacts can vary depending on the quality of the games used and the way they are integrated into the curriculum.

The authors emphasize the diversity of impacts of gamification and the importance of careful implementation to maximize its benefits. Critical analysis of the observed impacts reveals that while there are significant positive results, there is still a need for more in-depth research to fully understand how gamification affects long-term child development.

An important aspect to consider is the impact of gamification on children's motivation and engagement with the learning process. Rodrigues (2023, p. 73) observes that "gamification has shown a positive effect on children's willingness to participate in educational activities, making learning more attractive and less intimidating". This increase in motivation can have significant implications for children's future educational success, creating a positive foundation for their relationship with learning.

In summary, the impacts of gamification on learning and child development are varied and promising, covering cognitive, social, and emotional aspects. The reviewed literature shows that while there are clear benefits in terms of engagement, motivation, and the development of specific skills, a balanced and careful approach to the implementation of gamification is key. Consideration of the specific context of early childhood education, the quality of the educational games used, and proper integration with other pedagogical practices are crucial elements to maximize the positive impacts of gamification on child development.

FINAL CONSIDERATIONS

The research aimed to analyze gamification practices in early childhood education in Brazil, highlighting the benefits achieved and the challenges faced in learning through educational games. The main findings of this literature review point out that, although there has been significant progress in the implementation of gamification in early childhood education, its application still faces several practical challenges in schools. Gamification is a promising tool to enrich the teaching-learning process in early childhood, but its effectiveness depends on careful implementation adapted to the educational context.

It was observed that gamification practices in early childhood education have progressed towards creating more engaging and motivating learning environments. However, the need for adequate training of educators and the adaptation of games to the early childhood education curriculum are significant obstacles that still need to be overcome. Schools face difficulties in effectively integrating gamification into their pedagogical practices, balancing the playful aspect with educational objectives. This indicates that, despite the recognized potential, the effective implementation of gamification requires substantial investments in educator training and development of appropriate educational games.

Regarding the benefits of gamification in early childhood education, the survey revealed that there are positive impacts on children's engagement, motivation, and the development of specific skills. Practices such as the use of playful narratives, reward systems, and collaborative games have been shown to be effective in stimulating children's interest in learning. However, the effectiveness of these practices depends on careful implementation and alignment with the pedagogical objectives of early childhood education. The diversity of benefits observed reflects the potential of gamification as a complementary tool in the early childhood educational process.

Another point highlighted was the relationship between gamification and child development. The inclusion of game elements in educational practices should not be seen only as an engagement strategy, but as an approach that can contribute to the cognitive, social and emotional development of children. Promoting a playful learning culture is essential for gamification to be effective. This requires the active participation of educators, families, and school administrators, all working together to create an educational environment that harmoniously integrates the elements of games with pedagogical objectives.

Finally, the challenges identified in the implementation of gamification in early childhood education highlight the need for a balanced and judicious approach. Adapting games to different age groups within early childhood education, properly assessing children's progress in a gamified environment, and ensuring that gamification does not replace other important forms of learning and interaction are crucial aspects to consider.

The contributions of this study are significant, as they provide a comprehensive analysis of the benefits and challenges of gamification in early childhood education in Brazil. The findings underscore the importance of a continuous and integrated effort to implement effective gamification practices and promote quality early childhood education. However, there is a need for further studies to complement the findings of this study. Future studies could focus on practical case-specific evaluations of gamification implementation in early childhood education, analyzing the long-term impacts on children's development, and identifying successful strategies that can be replicated in different educational contexts.

In conclusion, gamification in early childhood education presents itself as a promising approach to enrich the teaching-learning process. Educational policies and pedagogical practices have advanced, but the effective implementation of gamification still faces significant challenges. An ongoing commitment to training educators, developing appropriate educational games, and promoting a culture of playful learning are key elements in ensuring the success of gamification in early childhood education. Therefore, a concerted effort by researchers, educators, and ed-tech developers is needed to overcome the obstacles and maximize the benefits of gamification, ensuring that all children have access to enriching and motivating learning experiences.

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