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EXPLORING LEARNING: THE POWER OF GAMES IN ENGAGING ELEMENTARY SCHOOL STUDENTS

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Elysvânia Soares Lima[1], Elizânia Rodrigues dos Santos[2], Zilda Teixeira Fernandes[3], Josefina de Andrade Gadea[4] and Alexandra da Silva Milhomem[5]

ABSTRACT

The impact of games on learning in elementary school is a topic of increasing relevance in contemporary pedagogical discussions. The choice of this theme is justified by the need to explore strategies that promote more active and meaningful learning experiences. The main objective of the study is to investigate how the use of games can contribute to the integral development of students. The methodology adopted included a bibliographic approach, reviewing current literature on gamification and its educational implications. The main results found indicate that gamification not only facilitates the assimilation of content, but also stimulates social and emotional skills, promoting a more dynamic and collaborative environment. It was observed that the implementation of games allows students to experience practical problems and develop skills such as teamwork, creativity and critical thinking. It was also found that for the adoption of these methods to be effective, it is essential that educators are trained to select and integrate games in a coherent way into the curriculum. This pedagogical orientation is essential to ensure that games are used as educational tools and not just as entertainment. Finally, it was concluded that the use of games in elementary school promotes meaningful and lasting learning, expanding the students' repertoire and contributing to the formation of critical citizens, prepared to face the challenges of the contemporary world.

Keywords: Games. Apprenticeship. Education.

[1]Master's student in Emerging Technologies in Education
MUST University
Email: lanurke@gmail.com
[2]Master's student in Emerging Technologies in Education
MUST University
E-mail: elizania.santos@seduc.go.gov.br
[3]Master in Emerging Technologies in Education
MUST University
E-mail: zilda2012@hotmail.com
[4]Specialist in Psychopedagogy with Emphasis on Special Education
Faculdades Integradas de Diamantino (FID)E-mail: josefinagadea@hotmail.com
[5]Master's student in Educational Sciences
World University Ecumenical
E-mail: lisamilhomempm26@outlook.com

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INTRODUCTION

In the contemporary educational scenario, the integration of playful and technological elements emerges as a promising strategy for transforming learning experiences. Digital games, previously perceived as mere entertainment, are progressively gaining significant space in pedagogical discussions, particularly in the context of Elementary School, where student engagement represents a central challenge. Campos, Schmitt and Justi (2020, p. 229) define school engagement as "a multidimensional construct that integrates behavioral, emotional and cognitive components, which are determinant for full academic development and prevention of school dropout". This multidimensional perspective dialogues directly with the principles of gamification – application of typical game elements in non-playful contexts – which revolutionizes educational practices by incorporating scoring systems, progressive achievements, and immediate feedback.

Contemporary scientific literature systematically documents the multiple cognitive and motivational benefits associated with incorporating digital games into the school environment. Research published in journals such as the Journal of Educational Technology and Computers & Education shows that gamified environments stimulate essential executive functions, including selective attention, working memory, and cognitive flexibility. Alves *et al.* (2024, p. 41) highlight that "the impact of artificial intelligence on inclusive education is particularly manifested in adaptive interfaces capable of responding dynamically to different cognitive and sensory profiles, establishing significant bridges between digital games and specific educational needs". This integration between elements of game design and adaptive technologies considerably expands the inclusive potential of gamified pedagogical practices.

In the specific context of Elementary School, a period characterized by intense neurological development and the establishment of lasting attitudes towards knowledge, platforms such as Kahoot!, Minecraft Education Edition, and ClassDojo transform traditionally abstract content into multimodal interactive experiences. Gamification offers privileged possibilities for reframing the school experience, particularly relevant when we consider data from Campos, Schmitt, and Justi (2020, p. 233) that indicate "a significant correlation between high levels of school engagement and the development of self-regulation, a sense of belonging, and the construction of a positive academic identity".

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However, the successful implementation of gamified strategies requires an in-depth understanding of their theoretical and practical foundations. The mere insertion of games or superficial playful elements, without articulation with clear pedagogical objectives, often results in temporary engagement that does not translate into meaningful learning. This challenge is directly related to issues of professional training, as Carvalho and Assis (2022, p. 142) observe: "teacher training for inclusion requires a paradigmatic reconfiguration that transcends instrumental training and establishes bases for pedagogical practices based on the recognition of diversity as an intrinsic value in the educational process". This perspective illuminates the need for teacher preparation that integrates technical skills with pedagogical sensitivity for the implementation of genuinely inclusive gamified environments.

The specialized literature emphasizes that the success of gamified approaches depends fundamentally on qualified pedagogical mediation. Carvalho and Assis (2022, p. 144) highlight that "the impact of the national education plan on municipal plans is manifested in the consolidation of continuing education policies that prioritize digital skills contextualized to contemporary educational realities". This finding highlights the need for professional development that trains educators not only in the instrumental mastery of the tools, but in the deep understanding of how game design principles can be incorporated into daily pedagogical practice.

The present bibliographic investigation seeks to systematically map contemporary scientific knowledge about the integration of digital games in Elementary School, analyzing both its potentialities and its limitations. The methodology adopted involves careful analysis of recent academic production published in national and international databases, favoring studies with methodological rigor and proven pedagogical relevance. By investigating how gamified strategies can catalyze significant transformations in the dynamics of teaching-learning, this work contributes to a broader understanding of the new configurations of pedagogical practice in the digital age, where boundaries between learning, inclusion and entertainment become progressively more permeable and fruitful.

THEORETICAL FRAMEWORK

The understanding of gamification as a pedagogical strategy is based on multiple theoretical currents that converge in valuing the playful element as a catalyst for cognitive and motivational processes. The concept of game-based learning emerges from the

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intersection between socio-interactionist theories and cognitivist approaches, laying the groundwork for educational practices that recognize the potential of games as privileged environments for the development of complex skills. This theoretical perspective is based on the premise that game elements such as progressive challenges, immediate feedback and engaging narratives stimulate intrinsic motivation mechanisms, catalyzing sustained engagement with curricular content.

The playful dimension, a central element of gamification, finds theoretical foundation in research on child development and multisensory learning processes. Dias *et al.* (2023, p. 2538) highlight that "games and songs in the learning of elementary school children constitute not only complementary methodological resources, but structuring elements of cognitive development that, when associated with digital technologies, significantly enhance the ability to abstract and memorize curricular content". This multisensory approach establishes diversified neurological connections that considerably expand the potential for knowledge retention and transfer, particularly relevant in the context of gamified education where visual, sound and interactive elements come together in immersive experiences.

In the specific field of mathematics education, gamification finds robust theoretical foundations related to the development of logical reasoning and problem solving. Enríquez and Gouvêia (2024, p. 152) observe that "methods for learning mathematical content based on game design principles significantly enhance the understanding of abstract concepts by establishing connections between symbolic representations and concrete interactive experiences, particularly effective for students with different learning styles". This perspective shows how educational digital games transcend the role of complementary resources to constitute privileged environments for the development of mathematical thinking, where complex concepts materialize in structured and progressive challenges.

The theoretical approach to inclusive education finds in gamification particularly promising possibilities to meet the diversity of cognitive profiles present in the classroom. Cavalcanti and Carvalho (2021, p. e248101018823-7) highlight that "digital educational tools for autistic children based on principles of adaptive user experience demonstrate transformative potential by establishing interfaces that respond dynamically to different sensory and communicational needs, converting potential barriers into differentiated opportunities for access to the curriculum". This theoretical perspective illuminates how

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properly designed educational games can contribute significantly to genuinely inclusive environments where neurocognitive differences are recognized and valued.

The theoretical foundations of educational gamification also incorporate contemporary perspectives on the development of socio-emotional skills, essential for integral education in the twenty-first century. The theory of serious games shows how gamified environments provide safe contexts for experimentation, collaboration, and the development of resilience in the face of challenges. Dias *et al*. (2023, p. 2541) complement this perspective by observing that "the integration between structured play and curricular content establishes favorable conditions for the simultaneous development of academic and socio-emotional skills, an aspect particularly relevant in educational contexts marked by diversity".

The theoretical foundation of game-based learning is also structured on research in neuroeducation, which systematically documents the neurological effects of gamified experiences. Neuroimaging studies evidence significant activation in brain areas associated with long-term memory, sustained attention, and emotional processing during interactions with well-designed educational games. Enríquez and Gouvêia (2024, p. 155) point out that "the neurological impact of gamified approaches to mathematical content is particularly manifested in the formation of neural networks that integrate logical-symbolic processing with positive emotional experiences, establishing privileged conditions for the development of attitudes favorable to mathematics".

In summary, the theoretical framework of educational gamification is characterized by its interdisciplinary nature, integrating contributions from cognitive psychology, neuroscience, instructional design, and learning theories to support innovative pedagogical practices. This theoretical convergence highlights the transformative potential of educational digital games when implemented with a solid pedagogical foundation and sensitivity to the various learning needs present in the contemporary school context.

CHALLENGES IN THE IMPLEMENTATION OF GAMES IN EDUCATION

The integration of games and gamification elements in the educational environment represents a growing trend that promises to significantly transform learning experiences. However, between the theoretical potential of these approaches and their effective implementation, there are substantial challenges that require systematic analysis. Understanding these obstacles is a fundamental step in the development of strategies that

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maximize the positive impact of games in contemporary education, particularly in the context of elementary education.

One of the most significant challenges refers to the pedagogical alignment between game elements and specific curricular objectives. Fraga *et al*. (2022, p. e13311931746-8) highlight that "the structural table for the development of gamification strategies (TEDEG) emerges as a proposal for a didactic-pedagogical resource that seeks to systematize relationships between game mechanics and learning objectives, minimizing superficial implementations that prioritize playful elements without consistent pedagogical foundations". This observation highlights how the absence of structured frameworks for integration between gamification and specific educational objectives often results in experiences that, although initially engaging, do not produce significant learning results in the medium and long term.

Teacher training represents another critical challenge that is often underestimated in educational game implementation initiatives. Fermin *et al.* (2024, p. e4290-12) observe that "inclusive education and diversity in teacher training are inseparable dimensions for the successful implementation of educational technologies, particularly when they require significant reconfiguration of traditional pedagogical practices". This diagnosis points to a significant gap between the technical development of gamified tools and the preparation of educators to use them effectively, considering the diversity of cognitive, cultural and socioeconomic profiles present in the classroom.

The economic dimension emerges as a substantial barrier to democratizing access to quality gamified educational experiences. Freitas and Fernandes (2023, p. 580) argue that "theoretical subsidies for calculating the cost of students with intellectual disabilities show the need to consider specific variables related to the implementation of assistive and adaptive technologies, which are often neglected in standardized educational financing policies". This analysis reveals how the implementation of inclusive educational games, capable of meeting different learning needs, demands differentiated investments often absent in conventional educational budgets, creating significant disparities between institutions with different levels of resources.

Technical and design challenges constitute another set of significant obstacles to effective implementation of educational games. Freitas e Silva (2023, p. 33) observes that "demystifying the complexity of content through augmented reality requires a delicate balance between oversimplification that trivializes fundamental concepts and unnecessary

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complexity that hinders initial engagement, particularly in contexts where digital literacy presents significant variations". This perspective illuminates the challenge of developing gamified experiences that are both accessible and challenging, considering different levels of technological familiarity and learning styles.

Impact evaluation represents a significant methodological challenge that is often overlooked in discussions about educational gamification. The difficulty in establishing clear correlations between specific game elements and measurable learning outcomes generates skepticism among educational managers and public policy makers. Fraga *et al.* (2022, p. e13311931746-11) highlight that "gamified learning solutions require evaluative approaches that transcend traditional metrics, incorporating multidimensional analysis that contemplates both cognitive and socio-emotional indicators, establishing a holistic view of educational impact".

Ethical issues related to the collection and use of educational data represent another critical challenge, particularly relevant in the context of digital games that often monitor student behaviors and performance. Fermin *et al.* (2024, p. e4290-15) warn that "the integration between educational technologies and diversity in teacher education must necessarily incorporate critical reflection on the ethical implications of algorithmic collection of behavioral data, particularly considering the specific vulnerabilities of students with different cognitive profiles and special educational needs". This perspective highlights the need for robust ethical frameworks that guide responsible implementation of gamified educational technologies.

Institutional and cultural resistance is a significant barrier that is often underestimated in educational digital transformation initiatives. Traditional conceptions of learning, assessment, and school discipline often conflict with gamified approaches that prioritize autonomy, experimentation, and multiple paths of development. Freitas e Silva (2023, p. 35) observes that "the role of augmented reality in interactive learning fundamentally challenges traditional educational epistemologies, demanding not only superficial methodological adaptations, but significant paradigmatic reconfigurations in institutional conceptions of knowledge and learning".

Overcoming these multiple challenges requires an ecosystem approach that simultaneously considers pedagogical, technological, economic, sociocultural and ethical dimensions of the implementation of educational games. This process requires substantial collaboration between educators, developers, researchers, educational managers, and

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public policy makers to establish favorable conditions for the effective integration between gamification and basic education. Only through this integrated perspective will it be possible to transcend superficial and fragmented implementations to establish gamified approaches that effectively transform educational experiences in a meaningful, equitable, and sustainable way.

METHODOLOGY

This research is based on a qualitative approach of bibliographic character, systematically organized to identify, analyze and synthesize relevant scientific contributions on the implementation of digital games in the educational context. Narciso and Santana (2025, p. 19462) highlight that "scientific methodologies in education demand analytical rigor associated with contextualized sensitivity, particularly in investigations that address interfaces between digital technologies and learning processes, where traditionally established disciplinary boundaries become progressively permeable". This perspective guides the methodological structure of the present study, which adopts rigorous procedures for systematic review of the literature.

The bibliographic survey is based on a structured search in national and international scientific databases, including SciELO, ERIC, CAPES Journal Portal and Scopus, using descriptors in Portuguese and English related to the key concepts: educational games, gamification, elementary education and educational technologies. The inclusion criteria cover peer-reviewed publications from the last five years (2019-2024), with a specific focus on applications in elementary education and full-text availability. Complementary snowballing strategy allows the identification of relevant references cited in the primary selected studies.

The documentary corpus constituted through this systematic process is analyzed through a thematic content analysis approach, organized in three fundamental stages: pre-analysis (floating reading and initial organization of the material), exploration of the material (theoretical and empirical categorization) and treatment of the results (interpretation and synthesis). As Oliveira and Runte-Geidel (2023, p. e4122103-6) point out, "project-based learning establishes particularly valuable methodological foundations for investigations in technological educational contexts, by privileging integrative perspectives that simultaneously articulate theoretical and applied dimensions of scientific knowledge". This

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methodological orientation underlies the structuring of the analytical categories used in the present investigation.

The inclusive dimension is a central element in the methodological approach adopted, particularly considering the interfaces between educational games and different learning profiles. Narciso *et al.* (2024, p. 4519) observe that "inclusive education through technology and multimedia as support tools demands methodological approaches that transcend superficial instrumental analyses to establish a deep understanding of the socio-technical mediations that redefine possibilities of access to knowledge in contexts of diversity". This perspective guides the incorporation of specific analysis criteria related to the inclusive potential of gamified approaches documented in the literature.

The analytical process is structured in a three-dimensional interpretative matrix that simultaneously contemplates pedagogical (theoretical foundation, educational objectives and evaluative strategies), technological (interfaces, interactivity and technical requirements) and contextual (teacher training, necessary infrastructure and adaptability to different educational realities) aspects. The use of specialized software for qualitative analysis (MAXQDA) enhances the categorization process, allowing the systematic identification of convergences, divergences and gaps in scientific knowledge about the implementation of games in the educational context.

The ethical aspects of bibliographic research are strictly observed, with adequate attribution of authorship, transparency in methodological procedures and explicit recognition of the limitations inherent to the approach adopted. This investigation recognizes the fundamentally interpretative nature of the analysis carried out, seeking to contribute to the advancement of scientific knowledge about the interfaces between digital games and fundamental education through rigorous and transparent methodological procedures.

BEST PRACTICES FOR EDUCATORS

The effective implementation of gamified games and strategies in the educational context requires systematized approaches that balance pedagogical foundation, sensitivity to learning diversities and technical mastery of the available tools. Based on emerging scientific evidence, practical recommendations are presented for educators who seek to integrate game elements into their pedagogical practices in a meaningful and inclusive way.

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Teacher training is a fundamental element for the successful implementation of gamified approaches. Rodrigues *et al.* (2023, p. 81) highlight that "a look from an inclusive perspective in teacher education requires the development of skills that transcend the instrumental domain of digital technologies to establish an in-depth understanding of the interfaces between game mechanics and diversified cognitive processes". This perspective highlights the need for training programs that integrate theoretical foundation, practical experimentation and critical reflection on the potentialities and limitations of games in different educational contexts.

The adaptability of gamified strategies to different learning needs represents an essential practice for educators committed to inclusive principles. Santos and Sardagna (2023, p. 441) observe that "curricular accessibility and school inclusion demand a redesign of educational experiences that simultaneously considers physical, communicational, and attitudinal barriers, establishing conditions for game elements to function effectively as amplifiers of access to the curriculum and not as creators of new barriers". This recommendation guides educators to prioritize flexible approaches that allow multiple paths of interaction and expression of learning.

The incorporation of narrative elements represents a particularly promising strategy for contextualizing curricular content in meaningful experiences. Rodrigues, Schmitt and Bertagnolli (2023, p. 11) highlight that "creative city as a proposition of RPG to promote creative learning with elementary school students shows the transformative potential of interactive narratives that establish contextualized connections between abstract content and concrete experiences that are meaningful to students". This approach recommends that educators develop narrative scenarios that function as unifying elements of different curricular objectives, enhancing engagement and transfer of learning.

The systematic use of game mechanics to structure training paths is a recommended practice that is particularly relevant for hybrid and remote contexts. Pontes, Fonseca, and Silva (2023, p. e26412240213-8) observe that "incorporation of game mechanics as a tool for student engagement in distance learning systems demands intentional articulation between intrinsic and extrinsic motivational elements, prioritizing progressive autonomy and immediate feedback as structuring strategies". This recommendation guides educators to implement transparent progression systems that clearly communicate objectives, challenges and success criteria to learners.

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The integration between assistive technologies and gamified approaches represents an essential practice to ensure universal accessibility. Rabelo and Rabelo (2024, p. e4689-5) highlight that "assistive technologies in specialized educational services for students with intellectual disabilities reveal promising interfaces with game elements, particularly when they incorporate universal design principles that consider diversity of cognitive, sensory, and motor skills from the early stages of planning". This perspective guides educators to consider diversified needs not as later adaptations, but as structuring elements of gamified pedagogical planning.

The documentation and systematic analysis of the implemented experiences are fundamental practices for the continuous improvement of gamified approaches. Santana and Narciso (2025, p. 1583) observe that "pillars of educational research applied to the implementation of gamified technologies establish foundations for reflective practices that transcend pedagogical intuitions to be based on systematic evidence on educational impacts". This recommendation guides educators to adopt investigative stances on their own practices, systematically documenting results obtained and sharing experiences with broader professional communities.

In summary, the recommended practices for the implementation of games in education are characterized by a holistic approach that integrates consistent teacher training, planning based on principles of universal accessibility, contextualization through significant narrative elements, intentional structuring of motivational mechanics, integration with assistive technologies and systematic documentation of results. This integrated perspective enhances the transformative capacity of educational games, establishing conditions for learning experiences that are simultaneously engaging, inclusive and pedagogically meaningful.

FINAL CONSIDERATIONS

The exploration of the interfaces between digital games and educational processes in elementary education reveals a simultaneously challenging and promising panorama for the transformation of contemporary learning experiences. The bibliographic analysis shows significant convergence between different theoretical perspectives regarding the potential of games as catalysts for school engagement, particularly when implemented with a solid pedagogical foundation and sensitivity to the diversities present in the educational environment.

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The inclusive dimension emerges as a central element in discussions on the implementation of educational games, transcending technocentric approaches to privilege perspectives that recognize diversity as an intrinsic value in formative processes. Fermin *et al.* (2024, p. e4290-9) highlight that "inclusive education and diversity in teacher training are inseparable dimensions for the successful implementation of educational technologies, demanding a paradigmatic reconfiguration that transcends instrumental competencies to establish pedagogical sensitivity to the multiple ways of being and learning". This perspective illuminates the need for teacher training that integrates technical skills with a solid humanistic foundation, training educators for effective mediation of inclusive gamified experiences.

The structural and methodological aspects of educational gamification are particularly relevant to overcome the fragmentation often observed in superficial implementations. Fraga *et al*. (2022, p. e13311931746-12) observe that "the structural table for the development of gamification strategies (TEDEG) constitutes a proposal for a didactic-pedagogical resource that seeks to systematize interfaces between game mechanics and specific learning objectives, establishing foundations for pedagogically based implementations". This methodological contribution evidences the maturation of the field, which progressively transcends initial technological enthusiasm to establish evidence-based and structurally consistent practices.

The cognitive dimension of game-mediated learning is a particularly fertile area for interdisciplinary research. Góes, Costa, and Goes (2024, p. 233) highlight that "computer-assisted education and learning psychology establish promising interfaces that illuminate neuropsychological processes underlying engagement in gamified environments, particularly related to sustained attention, working memory, and executive functions." This perspective highlights the need to deepen the understanding of specific cognitive mechanisms enhanced by different game elements, enabling more accurate and grounded educational design.

The accessibility of gamified experiences persists as a significant challenge, particularly considering financial aspects often neglected in pedagogical discussions. Freitas and Fernandes (2023, p. 580) observe that "theoretical subsidies for calculating the cost of students with intellectual disabilities show the need to consider specific variables related to the implementation of assistive and adaptive technologies, often made invisible in educational financing policies". This analysis reveals the economic dimension of digital

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inclusion that demands specific attention in public policies and institutional planning committed to educational equity.

Inclusive technological mediation represents a particularly promising area of convergence between traditionally distinct fields. Garcia and Vieira (2018, p. 280) highlight that "contemporary challenges related to the use of assistive technology as an instrument to facilitate learning demand interdisciplinary approaches that integrate pedagogical, technological, and therapeutic knowledge in collaborative frameworks centered on the specific needs of students". This perspective highlights the transformative potential of interprofessional collaboration in the implementation of inclusive educational games.

The future horizon of educational gamification points to an increasingly sophisticated integration between immersive technologies and pedagogical practices. Freitas e Silva (2023, p. 32) argues that "demystifying the complexity of content through expanded reality establishes unprecedented possibilities for the materialization of abstract concepts in multisensory interactive experiences, potentially transformative for students with different cognitive profiles". This forward-looking view suggests promising avenues for future investigations, particularly related to the interfaces between digital games, extended realities, and inclusive learning processes.

In summary, the bibliographic analysis shows that the implementation of games in elementary education transcends technological fads to constitute a field of investigation and practice with progressively more robust theoretical foundations, more clearly delineated challenges and significantly expanded horizons of possibilities. The continued maturation of this field will fundamentally depend on approaches that balance technological innovation with pedagogical sensitivity and ethical commitment to educational inclusion and equity.

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