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Gamification as an Effective Resource in the Literacy of Students with Autism Spectrum Disorder

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ABSTRACT: *Autism Spectrum Disorder (ASD) is a complex neurodevelopmental condition that significantly compromises cognitive, social, and communicative functioning. Among students in early grades, literacy presents additional challenges, particularly for those with ASD, due to the heterogeneity of their cognitive profiles and behavioral traits. This study aims to describe how gamification can be utilized as an effective resource in the literacy process of children with Autism Spectrum Disorder (ASD). This narrative, qualitative, descriptive, and exploratory review aimed to investigate whether gamification constitutes an effective pedagogical strategy in the literacy process of students with ASD. The study was conducted based on the PCC mnemonic (Population: students with ASD; Concept: gamification; Context: literacy) and guided by the research question: Can gamification be an effective resource for literacy instruction of students with Autism Spectrum Disorder? Searches were performed in five databases: PubMed, LILACS, Scopus, Web of Science, and Scielo, covering the period from 2019 to 2024, using descriptors combined with Boolean operators. A total of 983 articles were identified, and after the application of eligibility criteria, 16 studies were selected for full analysis. The findings demonstrate that gamification, when aligned with active methodologies and adapted to the specific needs of students with ASD, enhances engagement, promotes the development of cognitive and social skills, and fosters autonomy in literacy activities. The results highlight the importance of structured, visual, and interactive elements in gamified tools, such as Kahoot and Wordwall, which proved effective in improving attention, motivation, and participation. It is concluded that gamification, when properly implemented, offers a promising educational alternative that complements inclusive strategies and facilitates literacy processes in students with ASD.*

Key words*: Autism spectrum disorder, gamification, health literacy, literacy, students.*

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1. Introduction

Autism Spectrum Disorder (ASD) represents a complex neurological condition that significantly affects an individual's social, communicative, and behavioral development. Characterized by persistent patterns of difficulties in social interactions, communication, and restricted and repetitive behaviors (DSM-5, 2014), ASD manifests heterogeneously, ranging from mild to severe impairments. This diversity of manifestations justifies the term "spectrum", reflecting the wide range of clinical presentations and functionalities that may be observed.

Recent epidemiological studies indicate a higher prevalence of ASD in males (Ribeiro, 2022), while Brazilian educational data show that between 30% and 40% of students in the early grades of Elementary Education with ASD demonstrate significant difficulties in learning to read (Nunes & Walter, 2016). These statistics highlight the need for specific and adapted pedagogical approaches for this population.

Literacy, as a fundamental process for cognitive and social development, represents a particular challenge for children with ASD. Soares (2004) establishes an important distinction between alphabetization and literacy practices, the former related to basic skills of decoding and encoding written language, and the latter referring to the functional application of these skills in social and cultural contexts. For children with ASD, both processes require differentiated strategies that consider their cognitive and behavioral particularities.

The difficulties faced by students with ASD in the traditional educational environment are multifaceted. Beyond the challenges inherent to the disorder, such as deficits in communication and social interaction, sensory hypersensitivity, and resistance to change, there are structural barriers in the educational system. The scarcity of teachers adequately trained to work with the specificities of ASD, the lack of adapted pedagogical resources, and the absence of personalized teaching strategies contribute to an educational scenario frequently inadequate to the needs of these students (Barbosa, 2018; Silva et al., 2022).

The effective inclusion of children with ASD in the regular educational system has been the subject of growing scientific interest. Simpson et al. (2018) indicate that inclusive schooling can offer significant benefits for these children, provided it is implemented with the necessary supports. However, the efficacy of this inclusion depends on multiple factors, including adequate teacher preparation, implementation of appropriate behavioral interventions, curricular personalization, and the availability of adapted didactic materials (Carmo et al., 2022).

In this context, active learning methodologies emerge as promising approaches for the education of children with ASD. By positioning the student at the center of the educational process, these methodologies value autonomy, critical reflection, and experiential learning, aspects that can significantly benefit students with ASD. Among these methodologies, gamification stands out as a particularly relevant strategy, incorporating game elements into non-ludic educational contexts, enhancing student engagement and motivation (Carmo et al., 2022).

Given this scenario, the following research question emerges: Can gamification constitute an effective resource for the literacy of students with Autism Spectrum Disorder? This study seeks to explore the potentialities of gamification as a pedagogical strategy for the literacy of children with ASD, considering their cognitive, behavioral, and educational specificities. By investigating this theme, we intend to contribute to the development of more inclusive and effective educational practices that enable the maximization of these students' learning potential in an environment adapted to their singularities.

2. Literature Review

2.1. Autism Spectrum Disorder and Schooling

The schooling of children with ASD presents significant challenges due to the heterogeneous nature of the disorder and the limitations of traditional educational systems. Knight et al. (2019) observed that children with ASD frequently present discrepant abilities, with strengths in areas such as word recognition but difficulties in comprehension and verbal expression. This variability of cognitive profiles demands flexible and individualized educational approaches.

Among the pedagogical approaches recommended for students with ASD, Structured Teaching stands out, particularly the TEACCH method (Treatment and Education of Autistic and Communication Handicapped Children). According to Mesibov and Shea (2010), this approach emphasizes the creation of an organized and predictable learning environment, which can reduce anxiety and increase comprehension. Predictability and visual structuring are fundamental elements of this methodology, which aligns with the needs of many children with ASD.

Figueiredo, Lopes, and Mansur (2023) emphasize that, although some children with ASD present mild impairments, others may possess exceptional abilities in certain areas, requiring continuous support or specific mediations in their activities. This diversity of profiles reinforces the need for personalized pedagogical interventions adapted to the individual characteristics of each student.

Adequate teacher training constitutes a central pillar in the inclusive education of children with ASD. Rodriguez and Garro (2015) demonstrated that well-trained educators not only feel more confident but also

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implement more effective inclusive practices. However, Silva et al. (2022) point to a significant shortage of teachers trained to work with the specificities of ASD, which compromises the quality of education offered to these students.

2.2. Active Methodologies and Gamification in Education

Active methodologies represent a paradigmatic shift in education, transferring the protagonism of the learning process from the teacher to the student. Pereira (2012) highlights that these approaches reorganize the educational process, opposing the exclusivity of the teacher's intellectual action and the representation of the textbook as the sole source of knowledge. In the context of educating children with ASD, active methodologies offer valuable opportunities for the development of autonomy and engagement.

Among the various active methodologies, Problem-Based Learning (PBL) stands out for its emphasis on investigation and resolution of significant problems. As described by Pasqualetto et al. (2017) this approach promotes the development of competencies such as communication, collaboration, and self-management, particularly relevant aspects for students with ASD.

Gamification, as a pedagogical strategy, consists of applying game design elements in non-ludic contexts, aiming to increase the engagement and motivation of participants. Pimentel (2020) emphasizes that school gamification originates from the assumption of acting and thinking as in a game, but in an educational context. This approach has demonstrated promising results for students with ASD, due to its structured, visual, and motivational nature.

However, effective implementation remains contingent on comprehensive teacher training and institutional support. As emphasized by Pimentel et al. (2020) and echoed by newer reviews (Ramos Aguiar et al. 2023), successful adoption of gamified tools in special education hinges on educator preparedness, technological infrastructure, and continuous formative assessment.

Hamari et al. (2014) observed that gamification can make learning more active and engaging, although its effects depend significantly on the implementation context and user characteristics. For children with ASD, who frequently benefit from captivating and structured teaching methods, gamification can constitute a particularly effective strategy.

Carvalho, Coelho, and Godoy (2023) identified various benefits of gamification for people with ASD, including improvements in concentration, attention, collective learning, engagement, and perception of daily routines. These aspects are fundamental for the development of autonomy and social skills, areas frequently compromised in ASD.

Tavares et al. (2019), in their study on cognitive development and learning of children with ASD, highlight that gamification, by incorporating elements such as scoring, ranking, prizes, and challenges, makes activities more attractive and structured. This structuring facilitates the comprehension and active participation of children in the proposed activities, transforming the educational process into a more dynamic and motivating experience.

2.3. Gamification Tools for Literacy

Among the various gamification tools available for education, Kahoot and Wordwall stand out for their versatility and applicability in the context of literacy for children with ASD. Kahoot, originally developed as a research project at the Norwegian University of Science and Technology between 2006 and 2013 (Carneiro, 2020), allows the creation of personalized quizzes with multiple-choice questions. The platform offers immediate feedback after each response, rewarding participants for correct answers and creating a motivating environment. The visual and interactive nature of Kahoot aligns with the strong visual processing abilities frequently observed in children with ASD (Najeeb et al., 2020).

Sousa (2019) highlights that, despite some technical limitations, such as the character limit for questions and answers, Kahoot allows the creation of activities adaptable to different levels of knowledge. The possibility of playing in real-time and on various devices makes this tool particularly effective for promoting interaction among participants, a fundamental aspect for the development of social skills in children with ASD.

Sousa (2019) wordwall, in turn, is an online platform that enables the creation of personalized activities for the classroom, such as quizzes, word games, and competitions. This tool incorporates various gamification elements, such as time control, clear objectives, and simple rules, in addition to providing immediate feedback

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to participants. Wordwall's customization capability allows the adaptation of activities to the specific needs of each student with ASD, creating a more inclusive and motivating learning environment.

Moran (2015) observes that classes planned with games have been increasingly adopted in the school environment, as contemporary students are part of a generation accustomed to games, challenges, rewards, competitions, and cooperation. This familiarity with ludic elements facilitates the acceptance and engagement of students, including those with ASD, in gamified educational activities.

Lucian and Stumpf (2019) emphasize the diversity of applications available for people with ASD, some focused on specific activities and others aimed at developing multiple skills. This variety of resources allows the selection of tools appropriate to the individual needs of each student, enhancing the literacy process.

Current scientific literature suggests that gamification, when implemented adequately and considering the specificities of ASD, can constitute an effective strategy for the literacy of these students. By combining game elements with educational objectives, gamification creates an engaging, structured, and motivating learning environment, fundamental aspects for the educational success of children with ASD.

This study aims to describe how gamification can be used as an effective resource in the literacy of students with Autism Spectrum Disorder (ASD), exploring its pedagogical potentialities and identifying specific strategies for the implementation of this approach in the educational context.

3. Material and Methods

3.1. Type of Study

This is a narrative, qualitative, descriptive, and exploratory literature review, designed to answer the following research question: Can gamification be an effective resource for literacy instruction of students with Autism Spectrum Disorder (ASD)?

The research question was constructed using the PCC framework:

Population	Student with Autism Spectrum Disorder (ASD)
Concept	Gamification
Context	Literacy

Which generated the guiding question: Can gamification be an effective resource for literacy instruction of students with Autism Spectrum Disorder (ASD)?

3.2. Literature Search and Sampling

The literature search was conducted in the following databases: PubMed (National Library of Medicine), LILACS (Latin American and Caribbean Health Sciences Literature), SCOPUS, Web of Science, and Scielo. The search covered the last five years, from 2019 to 2024, including publications in English, Portuguese, and Spanish.

The following search descriptors were applied: Gamification OR Literacy OR “Autism Spectrum Disorder” OR Student, combined using Boolean operators AND and OR.

A total of 983 articles were retrieved:

- PubMed: 342
- Scopus: 423
- Web of Science: 183
- Scielo: 12
- LILACS: 23

3.3. Inclusion Criteria

- Publications from 2019 to 2024;
- Full-text availability;
- Studies in English, Portuguese, or Spanish;
- Original articles, case reports, clinical studies, normative reviews, integrative reviews, systematic reviews, meta-analyses, meta-syntheses, monographs, dissertations, and theses.

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3.4. Exclusion Criteria

- Articles whose titles and abstracts did not address the research objective;
- Publications outside the 2019–2024 timeframe;
- Opinion pieces, consensus documents, retractions, unpublished materials, or audiovisual content without academic validation.

3.5. Study Selection Process

The screening process was carried out in three stages by two independent reviewers.

1. First, duplicate articles (n = 632) were removed using the Microsoft® Office 2021 tools.
2. Next, titles and abstracts of the remaining 351 articles were evaluated independently by both reviewers, applying the inclusion and exclusion criteria.
3. Disagreements were resolved through discussion and consensus between the reviewers. In cases of persistent divergence, a third reviewer was consulted.

3.6. Data Extraction

Data extraction was conducted using a structured Microsoft Excel spreadsheet, developed by the authors. The extracted information included:

- Title
- Authors
- Year of publication
- Country of origin
- Study design
- Educational context
- Target population
- Description of the gamification strategy
- Main outcomes related to literacy and ASD

This spreadsheet served as the standard instrument of data collection, ensuring consistency across included studies.

3.7. Analysis and Synthesis of Data

A narrative synthesis approach was adopted to analyze the extracted data, grouping findings thematically based on recurrent patterns across studies.

The key categories that emerged were:

1. Cognitive and behavioral benefits of gamification in ASD students;
2. Educational tools and their customization potential;
3. Implementation strategies and observed challenges.

These categories were used to construct the discussion, allowing for critical comparison among the studies and contextual interpretation within the scope of literacy practices for ASD students.

4. Results

A total of 983 articles were initially identified through database searches. After the removal of duplicates and application of inclusion and exclusion criteria, a final sample of 16 studies was selected for full analysis.

The figure below illustrates the process of study identification, screening, eligibility assessment, and final inclusion, following the PRISMA-ScR guidelines (Page et al., 2021)

Insert Figure 1: Flowchart of Study Selection (PRISMA-ScR adapted).

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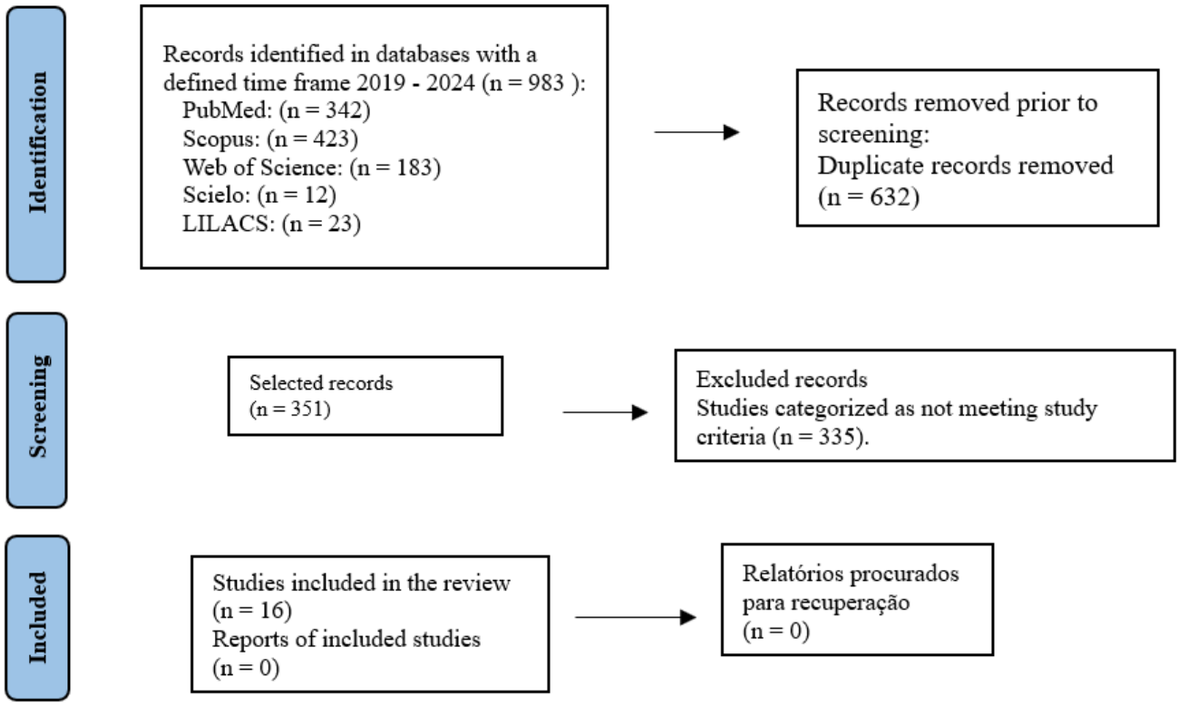


Figure 1. Flowchart of the review search strategy. PRISMA 2020 flowchart for new systematic reviews that included searches of databases, registries, and other sources. Scientific articles indexed from 2019 to 2024.

Table 1. Presents a synthesis of the main characteristics of the included studies.

Table 1. Summary of Included Studies.

Author (Year)	Objective	Study Type	Target Population	Gamification Strategy	Main Findings
Carvalho et al. (2022)	Evaluate cognitive impacts of gamification in ASD	Systematic Review	Children with ASD	Digital games and structured tasks	Improved attention, routine comprehension, and engagement
Lucian & Stumpf (2019)	Analyze apps for ASD learning	Descriptive Study	Children with ASD	Educational apps (various)	Positive results in reading and word association skills
Tavares et al. (2019)	Assess gamified mobile application	Applied Research	ASD children (6–10 yrs)	Mobile app with reward system	Greater interaction, increased participation, and improved memory
Silva et al. (2022)	Evaluate use of Kahoot in schools	Case Report	Teachers and students	Kahoot quizzes	Stimulates group collaboration and competitiveness
Sousa (2019)	Explore Kahoot in math education	Educational Report	Elementary students	Kahoot platform	Improves motivation and knowledge retention
Moran (2015)	Investigate educational games in literacy	Observational Study	General school population	Game-based activities	Games reinforce reading and writing skills
Carneiro (2020)	Study hybrid teaching using	Master's Thesis	Students in math classes	Kahoot + hybrid model	Enhances engagement and

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	Kahoot				facilitates formative assessment
Najeeb et al. (2020)	Develop smart mirror for autistic education	Engineering Design	ASD children	Gamified mirror	Interactive feedback improves engagement and verbal recognition
Pimentel et al. (2020)	Analyze teacher training with gamification	Integrative Review	Teachers	Digital gamification	Increases teacher engagement and creativity in class planning
Rodriguez & Garro (2015)	Investigate inclusive practices in ASD education	Qualitative Study	Regular school teachers	Not specified	Teachers see gamification as inclusive tool when properly guided
Knight et al. (2013)	Review tech-based interventions for ASD	Literature Review	ASD students	Multiple digital platforms	Gamified apps aid in academic and behavioral development
Mesibov & Shea (2010)	Present TEACCH method adaptations	Conceptual Paper	Children with ASD	Visual structure, routines	Predictability benefits learning; compatible with gamified routines
Moran et al. (2015)	Explore active methodologies in basic education	Case Analysis	School teachers	Use of ludic strategies	Gamification supports active participation and construction of knowledge
Figueiredo et al. (2023)	Examine tech use in ASD communication and literacy	Case Study	Children with ASD	Assistive technologies	Gamification improves language exposure and expressive communication
Bacich & Moran (2018)	Propose active methodologies for digital education	Educational Guide	General student audience	Hybrid and gamified environments	Facilitates student autonomy and differentiated instruction
Do Carmo et al. (2022)	Review behavioral interventions for ASD adolescents	Systematic Review	Adolescents with ASD	Not specific to gamification	Recommends structured approaches, indirectly aligned with gamified learning

Source: Elaborated by the authors based on data extracted from selected studies.

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4.1. Narrative Synthesis

The thematic analysis of the selected studies revealed that gamification promotes greater student motivation, improves attention spans, and facilitates participation in literacy-related activities. The majority of the studies employed digital tools (e.g., Kahoot, Wordwall, mobile applications) that integrate visual stimuli, instant feedback, and reward systems, elements that align with the behavioral characteristics of students with ASD (Hamari et al., 2014; Carvalho et al., 2022).

Furthermore, the use of structured and predictable mechanics in games, as observed in Wordwall activities or TEACCH-aligned applications, appears to reduce anxiety and resistance to learning in ASD students, fostering a more inclusive and participatory environment.

While studies vary in methodological rigor, they converge in recognizing gamification as a valuable educational ally, especially when personalized and responsive to the learner's pace.

5. Discussion

The present study aimed to understand gamification in the literacy process of children with ASD, which can positively influence engagement and educational progress in the learning of these students.

It was verified from the studies that Autism Spectrum Disorder (ASD) is a complex neurological condition that affects the development and social, communicative, and behavioral functioning of a person. Furthermore, according to DSM-5 (2014), ASD is characterized by persistent patterns of difficulties in social interactions, communication, and restricted and repetitive behaviors.

In the educational context, the study showed that the inclusion of children with ASD in the regular educational system has been a growing focus of research in recent years. The evidence also indicates that inclusive schooling faces various challenges such as adequate teacher training with the use of appropriate behavioral management techniques, differentiated teaching strategies, and the use of technologies for the proper development of this school-age student (Rodriguez & Garro, 2015).

It was evidenced that educational policies and legislation play a vital role in promoting the school inclusion of children with ASD. Laws such as the Brazilian Law for the Inclusion of Persons with Disabilities (2015), known as the Statute of Persons with Disabilities, guarantee the right to inclusive education and establish guidelines for school adaptation; however, these policies require continuous monitoring and adjustments to concretize the meeting of the needs of all children with ASD in the educational field. The effort must be collaborative among educators, families, and health professionals for truly inclusive education to occur. Nonetheless, inclusive policies alone are not sufficient: the didactic-pedagogical approaches must be adapted to the specific cognitive and communicative profiles of ASD students.

Regarding learning, it was found that gamification in education cannot be seen merely as a way to bring fun to a group of students, but it is necessary for the professional to focus on attending to the development of the learner's educational skills (Pimentel, Nunes & Júnior, 2020). Gamification, when aligned with clear pedagogical goals and applied systematically, proves capable of enhancing attention, engagement, autonomy, and cognitive flexibility, dimensions frequently impacted in individuals with ASD (Hamari et al., 2014; Carvalho et al., 2022).

In this way, the teaching-learning process for children with ASD in the traditional system has not been successful (Simpson et al., 2018); however, through games, it has been associated with various positive aspects, such as greater engagement, satisfaction in activities, improvement in attention, memory, logical reasoning and problem-solving, concentration, and better student performance in group interaction, which collaborates with social interaction, one of the negative aspects of ASD.

According to Carvalho, Coelho, Godoy (2023, p. 129) and Pereira (2012, p.6), Active Methodologies organize the learning process of the ASD student in their skills, promoting the possibility of incorporating them, reducing the differences in the educational process.

In addition to these pedagogical advantages, gamification promotes inclusion by offering differentiated pathways for content appropriation, enabling ASD students to progress according to their own rhythm and reinforcing social interaction through cooperative dynamics (Lucian & Stumpf, 2019).

6. Conclusion

The results of this review substantiate the growing consensus in the literature that gamification offers a viable, evidence-based strategy to support literacy among students with Autism Spectrum Disorder (ASD). Drawing from a wide range of studies published between 2019 and 2024, this analysis confirms that the intentional use of gamified tools, particularly when grounded in structured, individualized pedagogical frameworks, promotes significant cognitive, behavioral, and educational benefits for learners on the spectrum.

Fundamentally, the challenges faced by students with ASD in conventional literacy settings stem not solely from the core impairments of the disorder, such as deficits in social communication or sensory sensitivities, but also from educational systems that lack the flexibility and personalization required by these learners (Rodriguez & Garro, 2015; Silva et al., 2022). These systemic barriers include insufficient teacher training, rigid curricular demands, and a scarcity of adaptive teaching methodologies. Within this landscape,

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gamification emerges not as a peripheral or supplemental practice but as a central pedagogical response to a deeply individualized educational need.

6.1. Scientific Rationale and Educational Implications

The positive outcomes observed across the reviewed studies are consistent with constructivist learning theories that emphasize learner autonomy, engagement, and experiential learning. For instance, Hamari et al. (2014) argued that gamification can significantly increase motivation and participation when its componentes, such as rewards, feedback, and goal orientation, align with the cognitive and emotional profiles of learners. In students with ASD, these components address core areas of need by providing predictable structures, reducing anxiety, and enhancing task comprehension (Mesibov & Shea, 2010; Carvalho et al., 2022).

Moreover, recent empirical evidence underscores the critical role of visual structure and immersive environments in gamified education. Honorato et al. (2024) demonstrated that interventions incorporating 2D/3D formats, virtual and augmented reality environments foster substantial gains in focus and knowledge acquisition among students with ASD. Similarly, López Bouzas and del Moral Pérez (2023) highlight the role of gamified environments and serious games in strengthening linguistic competence and social interaction, two core dimensions essential to literacy development.

This theoretical foundation aligns with the TEACCH approach, which promotes structured teaching environments based on visual learning and routine (Mesibov & Shea, 2010). In this context, gamified platforms like Kahoot and Wordwall do more than merely entertain; they operationalize TEACCH principles in digital, interactive formats, transforming educational tasks into highly engaging, scaffolded experiences that resonate with ASD learners' strengths, especially their responsiveness to visual stimuli and preference for structured routines (Najeeb et al., 2020; Sousa, 2019).

Moreover, as Figueiredo et al. (2023) demonstrated, gamification tools not only support literacy by enhancing language exposure and decoding abilities but also bolster expressive communication and social interaction, two domains frequently impaired in children with ASD. These findings indicate that gamification has the dual potential to reinforce academic competencies and therapeutic objectives, a critical synergy in special education.

6.2. Convergence and Divergence with Prior Studies

This review's findings converge with previous empirical observations that gamification improves cognitive outcomes such as attention, memory, and problem-solving (Tavares et al., 2019; Lucian & Stumpf, 2019). Several studies in this review confirmed the efficacy of scoring systems, instant feedback, and challenge structures in sustaining attention and enhancing participation during literacy tasks, areas where many children with ASD traditionally struggle.

However, not all literature is uniformly optimistic. Hamari et al. (2014) cautioned that the success of gamification is heavily context-dependent, warning against overgeneralization. In this review, a minority of studies indicated that poorly designed gamified interventions may overwhelm students or distract from learning objectives, particularly when sensory stimuli are excessive or when game mechanics are not clearly tied to educational content.

Additionally, while many reviewed studies affirmed the role of gamification in fostering social interaction (e.g., Kahoot's collaborative quizzes), there remains a lack of longitudinal data exploring whether these interactions yield durable improvements in ASD students' peer relationships or generalized communication skills. Therefore, while the immediate benefits are robust, questions about long-term impact and generalization remain open.

6.3. Gamification and Active Methodologies

By embedding game elements within active learning methodologies, gamification positions students as agents of their own learning, a significant shift from the passivity often associated with traditional, lecture-based instruction. According to Pereira (2012) and Pasqualetto et al. (2017), such methodologies challenge learners to problem-solve, collaborate, and engage critically with content. In the case of ASD students, who may experience difficulties with flexible thinking or social communication, gamification facilitates scaffolded exposure to these challenges in a low-risk, high-reward format.

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For example, Kahoot's live quizzes create a controlled yet dynamic space for turn-taking, response inhibition, and verbal articulation, simulating real-world classroom interactions but within a safe, gamified shell (Silva et al., 2022; Carneiro, 2020). Similarly, Wordwall enables the creation of literacy activities that are visually clear, predictable, and easily modifiable, attributes that align with TEACCH principles and with the differentiated instruction advocated by Bacich & Moran (2018).

6.4. Inclusion, Equity, and Engagement

Perhaps most notably, gamification stands out as a catalyst for inclusion. As Lucian & Stumpf (2019) note, the wide availability and diversity of digital applications tailored to ASD learners allow educators to personalize content without isolating the student from peers. In other words, gamified platforms normalize differentiation, enabling inclusive classrooms where each student can engage with material at their level of ability and interest.

This flexibility reinforces equity, a central tenet of inclusive education policies such as Brazil's Statute of Persons with Disabilities (2015), which guarantees the right to education in environments that accommodate individual needs. However, as this study and others affirm, the mere presence of policies is insufficient without effective implementation, and gamification may represent one of the more scalable and impactful strategies to translate policy into practice (Barbosa, 2018; Simpson et al., 2018; Bhana Lopez et al. 2024; Davy, G. et al. 2024).

6.5. Limitations and Cautions

Despite these encouraging findings, several limitations must be acknowledged. As noted by the authors, the scope of this narrative review excluded non-English, Spanish, and Portuguese studies, possibly overlooking significant international research. Furthermore, most reviewed studies focused on short-term cognitive and behavioral outcomes, leaving long-term retention and transfer effects underexplored.

In addition, while tools like Kahoot and Wordwall were highlighted for their utility, the studies rarely addressed teacher training requirements or implementation challenges. As Rodriguez & Garro (2015) and Pimentel et al. (2020) emphasized, even the most promising tools fail without professional development and institutional support. Thus, future studies must consider not only the efficacy of gamified strategies but also their feasibility in diverse educational settings.

6.6. Final Remarks and Recommendations

This review reaffirms that gamification is not merely an educational trend but a scientifically grounded, pedagogically effective strategy for promoting literacy among students with ASD. Its strength lies in its adaptability, visual appeal, and capacity to engage learners who are often marginalized by traditional instructional methods.

To maximize its potential, the following recommendations are proposed:

1. Training and Support for Educators: Schools must invest in ongoing professional development to equip teachers with the skills to design and adapt gamified content effectively (Pimentel et al., 2020).
2. Customization of Tools: Gamified platforms should allow for easy personalization, aligning with the heterogeneity of ASD learners (Lucian & Stumpf, 2019).
3. Monitoring and Evaluation: Future research should incorporate longitudinal assessments to evaluate the sustainability of gamification's benefits.
4. Family Involvement: Integrating gamified activities at home may enhance learning generalization and support collaboration between schools and families (Figueiredo et al., 2023).
5. Policy Alignment: National and local policies should explicitly recognize gamification as a formally endorsed inclusive strategy, supporting its integration into curricula and funding priorities.

In conclusion, when implemented thoughtfully and supported institutionally, gamification offers a transformative pathway for advancing literacy in students with ASD. It bridges cognitive science, pedagogical innovation, and technological design, an intersection that holds immense promise for inclusive education in the 21st century.

7. Limitations of the Study

Despite the relevance of the findings, this review presents some limitations that must be acknowledged.

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- Firstly, the study selection process was limited to three languages (Portuguese, English, and Spanish), which may have excluded relevant research published in other languages.
- Secondly, the temporal filter restricted to the last five years (2019–2024) may have led to the omission of foundational or seminal studies in the field.
- Thirdly, as a narrative review, the methodological rigor of critical appraisal and bias control differs from that of systematic reviews, which can impact the generalizability of the results.
- Finally, there is a potential risk of selection bias due to the subjective judgment applied during the full-text screening process.

Future studies with systematic designs and meta-analytic methods may provide stronger evidence regarding the effectiveness and limits of gamification strategies for students with ASD.

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Co-Authors Contribution:

1. Contributed to the conceptualization and design of the study, coordinated the data collection and extraction process, and led the writing of the first draft of the manuscript.
2. Participated in the literature review, analysis, and synthesis of selected articles, and collaborated in the structuring of the results and discussion sections.
3. Was responsible for organizing the research methodology, managing references, and contributed to the refinement of the narrative synthesis.
4. Reviewed and revised the manuscript critically for important intellectual content, ensured compliance with formatting and academic standards, and assisted in final editing.
5. Provided supervision throughout the project, validated the methodological rigor, and contributed significantly to the theoretical framework and final conclusion of the study.

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