Impact of gamification on school engagement: a systematic review

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School engagement is defined as students' dedication to activities empirically linked to desired outcomes. This concept encompasses all dimensions of being: academic, emotional, and behavioral. Gamification is presented as an innovative strategy in the field of education because using game design elements can engage students in the learning process. This systematic review sought to analyze the development of research in the academic literature on gamification as a strategy to favor school engagement in primary and secondary education, conducted between 2013 and 2023. A total of $n = 90$ interventions that met the inclusion criteria were identified using the PRISMA methodology guidelines. The results show that there is a need to evaluate school engagement from a broader perspective when using the gamification strategy and to identify other elements that are necessary to achieve the proposed objectives in the teaching and learning process. Findings also demonstrate that it is important to consider a more holistic view that includes not only motivation and participation, but also other factors and dimensions of school engagement.

KEYWORDS

engagement, education, gamification, primary education, systematic review

1 Introduction

Academic literature has used the term "school engagement" or "student engagement" for more than 80 years. The concept has evolved from its various meanings to emphasize its importance to students' academic success. Its origins can be traced back to Tyler, who demonstrated the positive effects of time spent on the learning task (Groccia, 2018). In 1970, Robert Pace understood school engagement as the quality of effort; that is, the more time and energy one devotes to a task with an educational purpose, the more enriched the student experience becomes. Astin (1984), unifying the two assumptions of the aforementioned authors, coined the term "student involvement," referring to the quantity and quality of energy, both physical and mental, that students invest in their learning process. This theory, when applied to university students, posits that a greater degree of immersion on campus leads to greater learning and personal development. Based on these concepts, several authors have considered school engagement fundamental to developing effective practices that primarily benefit students (Tinto, 2012; Chickering and Gamson, 1991; Davis, 2006; Kuh, 1995).

School engagement depends on myriad factors that influence students' desire to learn (Pineda-Báez et al., 2019). Kuh (2009) commonly uses the term engagement to represent constructs such as quality of effort and involvement in productive learning activities. Numerous positive outcomes, such as persistence, grades, and satisfaction, are associated with school engagement. Student-teacher interaction is important for learning when students are encouraged to devote more effort to other educational activities (Kuh et al., 2011).

The current educational system implemented in schools prioritizes students' academic results over the purpose of teaching. The school's refusal of more flexible curricula and evaluation systems (Gallego et al., 2022) hinders the development of learning and innovation

skills, leading to a lack of commitment and boredom in the educational process.

The lack of school commitment has been directly related to the low development of students' socioemotional competencies, insufficient family support, poor academic performance, and low expectations about their own performance or about the future. Gamification is one of the strategies used in recent years to contribute to the factors considered in school engagement, and it has gained special relevance in the basic education contexts of primary, secondary, and higher education (Agustín, 2023).

According to Deterding et al. (2011) and Manzano-León et al. (2022), gamification is the application of game design elements in non-game environments as a challenging response to draw and engage students using constructivist currents in which they actively participate, recreating their own learning.

Gamification contributes to the learning process when classroom experiences show that this strategy allowed the development of experiential, participatory, and creative skills (Manzano-León et al., 2022). Gil-Quintana and Jurado (2020) concluded that gamification allows students to meet better expectations, which makes them feel more engaged in their learning processes. Therefore, it is believed that the use of ramified strategies will help to improve student learning due to their high level of motivation, feedback, challenges, direct participation through the game, and the natural assimilation of knowledge.

In the field of research, systematic reviews have analyzed studies based on gamification that highlight its benefits, not only in the traditional classroom but also in business and commercial fields, as a factor that positively impacts self-efficacy, commitment to learning, participation, and increased perceived enjoyment. However, methodological flaws in gamification research are recognized, as is a conceptual gap in the theoretical understanding of gamification and its implementation (Hamari, 2017; Koivisto and Hamari, 2019; Rathee and Dagar, 2024; Triantafyllou and Georgiadis, 2022).

In the educational field, applied research on the use of gamification for school engagement focuses on higher and distance education, leaving aside primary education. In addition, school engagement is taken in a fractioned way, focusing on perspectives on participation, motivation, and self-regulation, among others, and making a broader approach to the term impossible (Alzahrani, 2020; Arufe-Giráldez et al., 2022; Balalle, 2024; Flores, 2015; Kowitlawakul et al., 2022; Bilro et al., 2022; Loureiro et al., 2021; Ratinho and Martins, 2023; Souza et al., 2018; Tavares, 2022; Triviño-Cabrera et al., 2021) The aim of this article is to analyze the development of research in the international literature on gamification as a strategy to promote school engagement in primary and secondary education, summarizing the main findings, which will allow planning future research, filling a gap in the current literature, and answering the following question: How has the implementation of gamification facilitated school engagement in primary and secondary education?

2 Methods

This article on gamification as a strategy to promote school engagement in primary and secondary education was conducted through a qualitative analysis of the data, which focuses on the synthesis and critical evaluation against the available evidence of a specific topic to be addressed in the literature (Whittemore et al., 2014).

2.1 Search criteria

This search focused on the period from 2013 to 2023. We chose this decade because, despite extensive research on school engagement since the 1990s, the incorporation of technology into education has significantly influenced pedagogical practices since the early 2010s. The use of digital tools and technological strategies has transformed teaching (Kapp, 2012). Initially, the study concentrated on primary education, but due to the limited literature, we expanded the search to secondary education to conduct a more comprehensive review.

We conducted the search using the following databases: (1) Web of Science (WoS), (2) EBSCO, and (3) SCOPUS. These databases are the most widely used for reliable reviews because they cover different types of research (Zhu and Liu, 2020). The review included research in both Spanish and English, but excluded books, book chapters, conference papers, review articles, and meta-analyses.

2.2 Source identification

The study was reviewed using the PRISMA (Preferred Reporting Items for Systematic reviews and Meta-Analyses) statement. In the databases, the search was conducted through a string of words that sought to facilitate the inclusion of several journals, in addition to several categories, as suggested by the statement (Leydesdorff et al., 2013).

The following search equation was entered in the three databases: (1) gamif* OR "learning based games" OR LEARNING AND "elementary" OR "primary school" OR "secudary school" SAME "student engagement" OR "school engagement" NOT "university"; (2) gamification OR game based learning OR learning + based + game AND school engagement OR student engagement OR engagement AND primary OR secondary; (3) TITLE-ABS-KEY ("gamif*") AND TITLE-ABS-KEY (learning) OR TITLE-ABS-KEY ("based games") AND TITLE-ABS-KEY (elementary) OR TITLE-ABS-KEY ("primary school") OR TITLE-ABS-KEY ("secudary school") OR TITLE-ABS-KEY ("student engagement") OR TITLE-ABS-KEY ("school engagement") AND NOT TITLE-ABS-KEY ("university"), inclusion criteria were raised such as the studies had to be empirical, published from 2013 to 2023, conducted in primary and/or secondary school and with keywords such as gamification, school engagement, motivation, participation, academic success and game-based learning.

2.3 Data extraction and analysis

The initial search was conducted in February 2024, yielding 739 articles. After eliminating the duplicates found, exclusion parameters are established: by title, then by Open Access, and some are eliminated independently by abstract.

After eliminating texts that did not meet the inclusion criteria, 90 studies were included in the qualitative analysis. A content analysis was conducted that considered (a) initial reading, (b) coding

and definition of categories and subcategories, and (c) description and systematization of the findings (Elo and Kyngäs, 2008) (see Figure 1).

In the systematic review, descriptive work is performed to identify the growth trajectory and geographic distribution of the literature. The analyses were performed using Microsoft Excel, which allowed categorization of the articles. Visme.net was used to construct a heat map. Finally, extract relevant data that supports the answer to the research question from a qualitative point of view.

3 Results

To obtain a reliable systematic review, a statistical calculation was performed to validate the number of studies reviewed (see Figure 2), resulting in a 95% reliability rate.

From 2013 to 2015, research related to the use of gamification with school engagement was low. From 2016, growth starts to be seen, until 2020, when the systematization of the developed applications decreases, with remarkable growth again from 2021 to 2023 with approximately 15 to 24 investigations.

3.1 Geographical distribution

Figure 3 shows a heat map of the articles published. The studies collected from the databases were not excluded by country or language. It is evident that the domain of knowledge about gamification for school engagement is found in the United States (11), China (8), Spain (8), Turkey (6), Greece (6), Taiwan (6), and Hong Kong (6), which account for 47% of the articles. Other countries such as Germany (3), Malaysia (3), Saudi Arabia (3), the United Kingdom (4), Brazil (2), Canada (2), Ireland (2), and Pakistan (2) have also shown growth in these investigations. The heat map with the results shows that the continent where most of this type of research has been conducted is Asia (South Asia), with a representative percentage of 71%.

3.2 Approaches to the meaning of school engagement

We understand school engagement as the time and effort students devote to activities that empirically link to desired life outcomes (Kuh, 2009). Çakiroglu et al. (2017) understood school engagement as a connection to deep and meaningful learning in which educators act on students' expectations. Fredricks et al. (2004) classified school engagement into three categories: emotional engagement, which involves students' affective reactions in the classroom, behavioral engagement, which involves student behavior within the school, and cognitive engagement, which involves academic work. Behavioral engagement is the practice of following rules when performing tasks. Emotional engagement encompasses interest, values, boredom, happiness, and other emotions; cognitive engagement incorporates components such as cognitive effort and the use of strategies for learning (Çakiroglu et al., 2017). According to these postulates, school commitment is based on implicit concepts such as motivation, participation, self-regulation, and learning achievement.

In the framework of the literature review, different authors have worked on motivation, highlighting its importance in the educational process, especially in second language learning and reading proficiency, as well as teamwork as a strategy to facilitate student learning (Martín-Del-Pozo et al., 2019; Li and Chu, 2021; Peura et al., 2023; Zhang and Crawford, 2023). We also understand motivation as the central aspect for implementing teaching strategies in the fields of science and mathematics, where we can evaluate the students' level of interest, enjoyment, and perception of the subject matter (Papadakis, 2022; Zourmpakis et al., 2022; Eckert et al., 2023; Naumoska et al., 2023; Sipone et al., 2023).

In terms of participation, researchers defined it as the immersion of students in their learning process (Xu et al., 2017) and sought to potentiate it through personalized learning, meaningful learning, educational needs, and systems thinking (Lester et al., 2014; Xu et al., 2017; Zaric et al., 2021; Abenes et al., 2023). The results show that although participation improves during the implementation of strategies that favor engagement, constant monitoring is necessary to maintain a stable level of participation.

An individual's ability to apply their acquired knowledge serves as evidence of learning achievement. Research by Antonopoulou et al. (2022), Kaldarova et al. (2023), and Slattery et al. (2023) supports the idea of improved learning achievement through the use of ramified strategies. However, other types of applications demonstrate that motivation is not synonymous with academic success (Hanghøj et al., 2018).

3.3 Conceptualization of gamification

Constructivist currents propose gamification as a challenging response to attract and engage learners, allowing actively participating students to produce or recreate their own learning. When we talk about gamification, we should refer to game-based learning. Within research, game-based learning is defined as providing opportunities related to active learning, self-regulation, fun, and social interaction (Veldkamp et al., 2022; Naumoska et al., 2023). In addition, it seeks to integrate effective problem-solving episodes through engaging learning experiences for the student, which makes it an alternative with outstanding potential that significantly impacts education, especially critical thinking (Lester et al., 2014; Pearce, 2023).

Game-based learning creates a more relaxed learning environment that encourages students' participation, interest, and confidence in their learning process (Deng et al., 2020; Yu et al., 2021; Balaskas et al., 2023; Kaldarova et al., 2023). However, while students successfully solve the challenges and problems presented by the game, they struggle to effectively apply the acquired learning and skills in other contexts. Researchers recommend more immersive and diverse educational programs that involve teacher training to foster student interest in their academic journey.

Within the process of gamification and game-based learning, the authors also used video games as a learning strategy. Commercial video games serve as a tool to enhance social and learning interactions among at-risk students (Hanghøj et al., 2018). Slattery et al. (2023) recognize the significance of video games in the learning process as a component of the technological interaction students should engage in, enabling them to enhance their processes. They clarify that the incorporation of these technologies does not determine academic

FIGURE 1
Detailed flowchart of source identification.
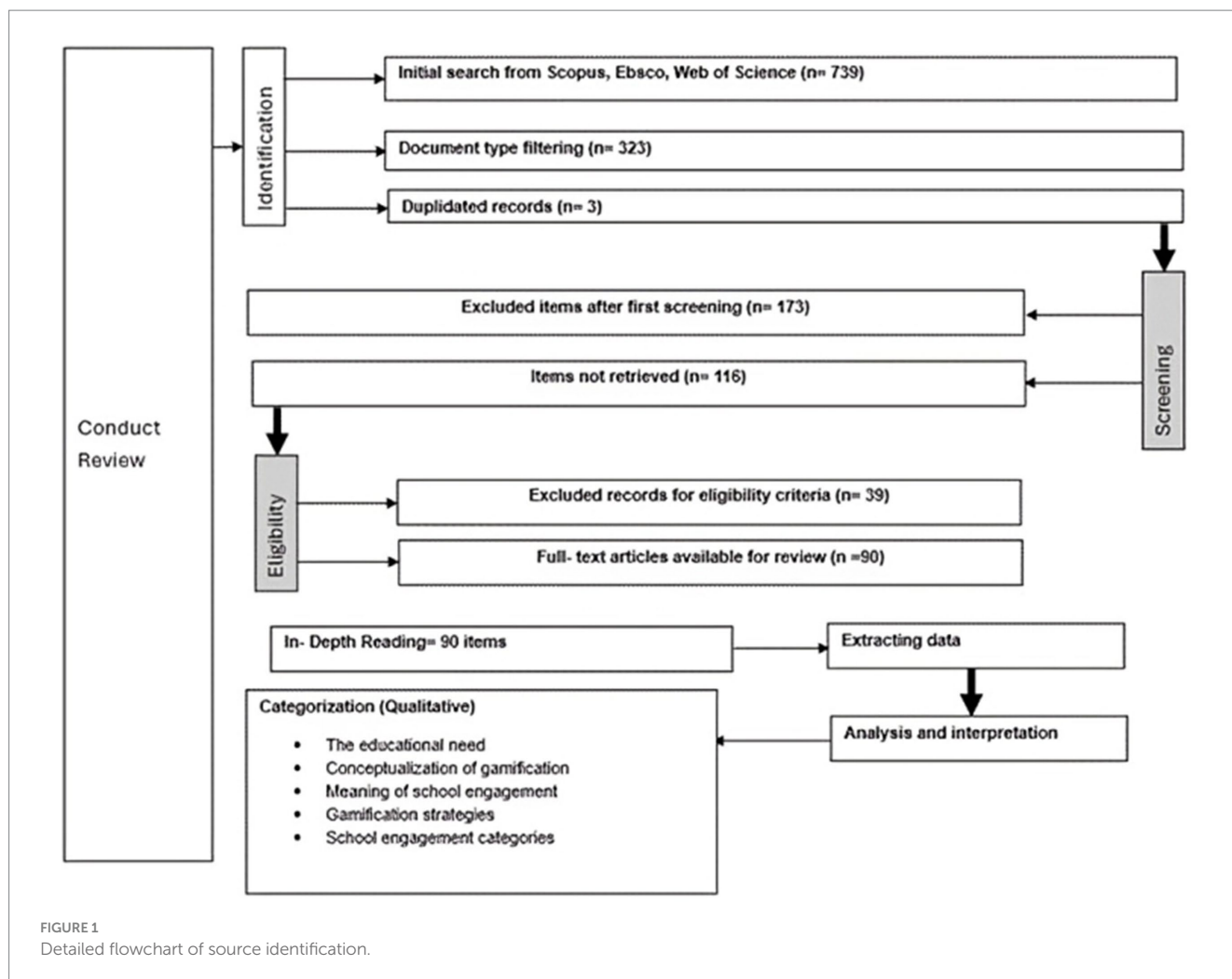
achievement, but rather that further exploration is necessary to achieve the desired objectives.

Several researchers have worked on gamification and understand that it is a technique that proposes dynamics associated with the design of games in the educational environment to stimulate direct interaction with students, allowing them to develop their curricular, cognitive, and social skills. Gamification allows students to be engaged and motivated in tasks, promoting learning and problem solving (Khan et al., 2017; Garcia-Sanjuan et al., 2018; Jagušt et al., 2018; Rachels and Rockinson-Szapkiw, 2018; Jones et al., 2019; Martín-Del-Pozo et al., 2019; Deng et al., 2020; Anunpattana et al., 2021; Zaric et al., 2021). It recognizes the importance of using gamification in a connected-disconnected manner and even talks about adaptive gamification according to the interests of the students. When gamification enters the classroom, motivation is enhanced; hence, student engagement generates correlations among motivation, efficacy, participation, and self-regulation (Sitra et al., 2017; Çakiroglu et al., 2017; Atin et al., 2022; Janković et al., 2023).

In contrast, there is research that shows that motivation does not generate significant differences in academic achievement compared with traditional strategies (Chen et al., 2016; Rachels and Rockinson-Szapkiw, 2018; Bilbao-Aiastu and Miranda-Urquij, 2022). From the above, it is evident that there is a lack of relationship between gamification and the work of all the dimensions of school engagement,

since the splitting of evaluating only factors such as motivation or participation has presented contradictory results among the researchers and makes it necessary to evaluate the causes that cause this diversity of conclusions.

3.4 Implementation of gamification in classrooms to foster school engagement

The conducted systematic review suggests that strategies that enhance learning, academic performance, motivation, participation, and collaborative learning can lead to gamification in primary and secondary education classrooms. It is possible to learn through gamified activities because they include metacognitive triggers that encourage students to keep an eye on, plan, and evaluate their learning (Su and Cheng, 2015; Maxwell, 2016; Jagušt et al., 2018; Abd-Mutalib et al., 2019; Aljraiwi, 2019; Mee Mee et al., 2020; Altaie and Jawawi, 2021; Li and Chu, 2021; Aguilar et al., 2022; Bilbao-Aiastu and Miranda-Urquij, 2022; Papadakis, 2022).

Digital storytelling is another way to generate learning through more student-friendly environments (Kouvara et al., 2019; Tímea, 2023). Gamified activities have found in recent years a relevant application in STEM subjects, which demonstrated that they can increase students' engagement and motivation and even improve their performance in
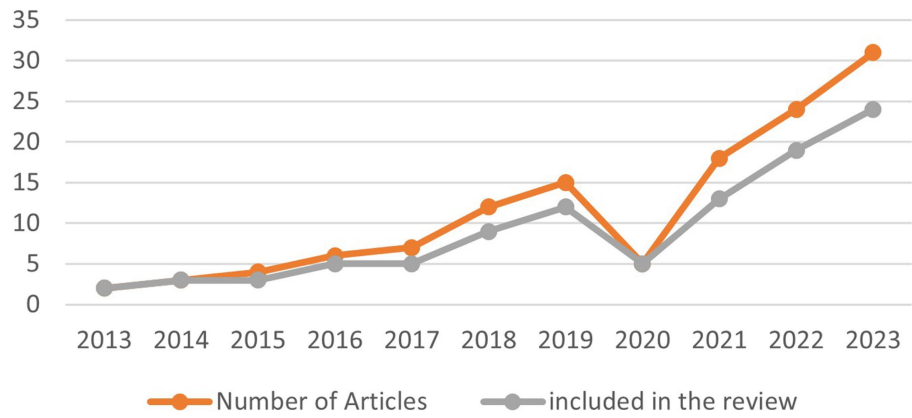
FIGURE 2
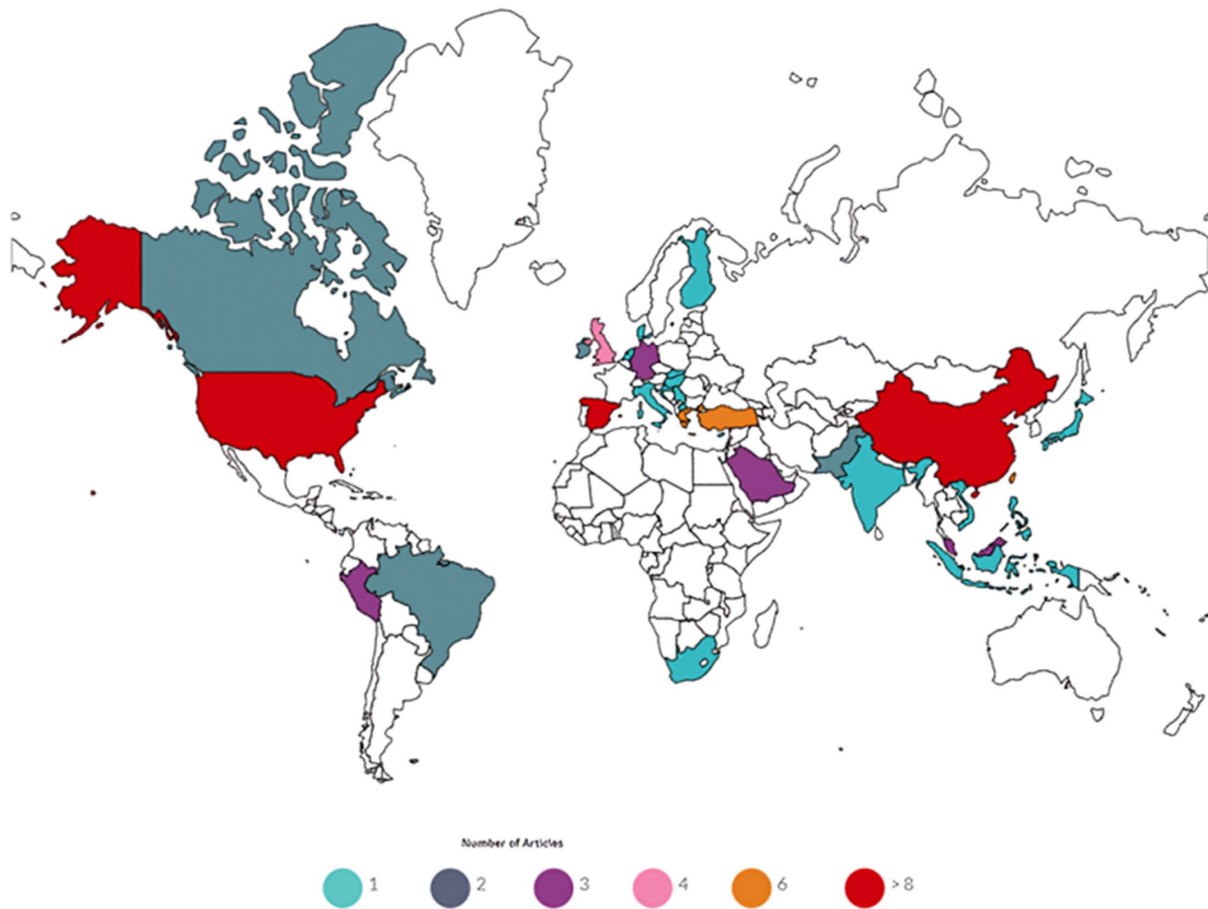Reliability analysis of the research sample.

FIGURE 3
Article map.

academic tasks (Dare et al., 2018; Jagušt et al., 2018; Zhao et al., 2021; Bilbao-Aiastu and Miranda-Urquij, 2022; Eckert et al., 2023; Ballestar et al., 2024). However, the researchers recognize the need for a long-term evaluation. Additionally, the researchers highlight the lack of teacher training and continuous support from educational entities to implement these strategies in the classroom and achieve a greater impact.

Gamified quizzes are another form of gamification in the classroom; according to researchers, these tools provide an engaging learning experience for students, which contributes to increased engagement and motivation and even retention and appropriation of concepts (Garcia-Sanjuan et al., 2018; Jones et al., 2019; Orhan Göksün and Gürsoy, 2019; Anunpattana et al., 2021; Balaskas et al., 2023; Janković et al., 2023; Zhang and Crawford, 2023). The ramified questionnaires developed in the studies were worked on in specific subjects (biology, technology, and English as a second language), where only concepts and knowledge of each area were taken into account, forgetting the benefits of this strategy such as immediate feedback, increased motivation, and the achievement of goals or achievements proposed for the comprehensive learning of students, leaving aside the transversality of knowledge.

Similarly, the analysis allows us to observe the importance of the distinction between connected and disconnected gamification. Regardless of the educational context, the results demonstrate the usefulness of both strategies in enhancing school engagement factors like motivation, participation, and academic performance. Both disconnected or analog gamification (the use of cards, creation of board games or activities that do not require any kind of connection) (Benton et al., 2021; Franco, 2022; Holguin-Alvarez et al., 2022; Veldkamp et al., 2022; Manassero-Mas and Vázquez-Alonso, 2023; Naumoska et al., 2023; Qiao et al., 2023) as the use of connected gamification (digital environments, mobile applications) (Chen et al., 2016; Khan et al., 2017; Sitra et al., 2017; Çakiroglu et al., 2017; Xu et al., 2017; Gresalfi et al., 2018; Halloluwa et al., 2018; Hanghøj et al., 2018; Rachels and Rockinson-Szapkiw, 2018; Chau et al., 2019; Garmen et al., 2019; Rebelo and Isaías, 2019; Zhao et al., 2021; Atin et al., 2022a; Drljević et al., 2022; Akman and Cakir, 2023; Barkela et al., 2023; Celis et al., 2023; Hejaili and Newbury, 2023; Pearce, 2023; Qiao et al., 2023) have been shown to be effective in improving the components of school engagement.

Researchers found that these strategies, by presenting entertaining activities in the teaching and learning process, lead to meaningful learning for students. The authors identified some limitations in the application of analog and digital gamification, including the need to design interventions that align with curricular objectives to foster meaningful student engagement. In addition, the design of ramified activities should have a specific purpose in student learning, taking into account the level of complexity and the educational need to be addressed, to maximize their performance in the classroom (Pollanen et al., 2015; Su and Cheng, 2015; Maxwell, 2016; Hanghøj et al., 2018; Kouvara et al., 2019; Altaie and Jawawi, 2021; Bilbao-Aiastu and Miranda-Urquij, 2022; González-Robles and Vázquez-Vílchez, 2022; Abenes et al., 2023; Cheng et al., 2023; Ballestar et al., 2024).

3.5 Cognitive and behavioral impact of gamification

Gamification not only provides an alternative experience that enhances participation and motivation but also influences various behavioral aspects, including collaboration in academic engagement,

as noted by several authors. It is particularly effective in fostering peer collaboration and positively transforming the individual's learning environment (Garcia-Sanjuan et al., 2018). The significance of comprehending collaborative environments in gamification that enhance organizational skills, problem-solving abilities, and self-confidence is underscored (Reynolds et al., 2013; Maxwell, 2016; Halloluwa et al., 2018; Hanghøj et al., 2018), while also noting the necessity for further research to substantiate these assertions.

According to researchers, the use of gamified elements in the classroom improves students' self-perception in facing and overcoming challenges, resulting in increased engagement and confidence in problem-solving and critical thinking (Rachels and Rockinson-Szapkiw, 2018; Celis et al., 2023; Peura et al., 2023). Although students' metacognition about their learning process improves, there are no substantial variations in learning outcomes (Khan et al., 2017; Rachels and Rockinson-Szapkiw, 2018).

From a cognitive standpoint, gamification makes a significant contribution to reading comprehension by increasing students' interest in reading and fostering meaningful 21st-century learning skills and experiences like systemic, computational, and creative thinking (Aljraiwi, 2019; Altaie and Jawawi, 2021; Haas et al., 2022; Holguin-Alvarez et al., 2022). However, the necessity of considering students' choices and interests in an individualized or tailored way is highlighted in order to have a good influence on learning results.

4 Discussion

This systematic review aimed to identify the types of research on gamification and its application as a strategy to enhance school engagement in primary and secondary education. We used the PRISMA methodology to sift through the studies, obtaining 90 articles that analyzed the meanings of school engagement, the conceptualization of gamification, and the impact of gamification in schools. We conducted a qualitative analysis of the data, emphasizing the synthesis and critical evaluation against the existing evidence of a specific topic in the literature (Whittemore et al., 2014).

The results indicated that most of the research is in the years 2022–2023 (48%). This suggests an increased interest in developing ramified classroom practices and how their application influences school engagement components. The continent with the greatest influence on this issue is Asia (71%). The USA, Canada, Peru, and Brazil have conducted research in the Americas. However, many countries still lack a clear understanding of this issue and the strategies to improve it in the classroom.

In this sense, the regions that have developed research on school engagement approach it from two distinct angles. On the one hand, it is marked by behavioral, emotional, and cognitive dimensions (Khan et al., 2017; Çakiroglu et al., 2017), which show that more research is needed on how increased school engagement is evidenced in better outcomes leading to academic success. Although the studies sought to increase school engagement, the factor that stands out the most is the increase in motivation, overlooking other components of student engagement such as self-regulation, control, performance, and participation.

Some scholars assert that gamification enhances motivation and cultivates self-efficacy and confidence in students' capacity to address academic obstacles. This positively impacts their performance and behavioral engagement, suggesting an enhancement in the attainment

of learning goals. To attain this goal, gamified exercises were implemented in the classroom to boost students' problem-solving abilities, critical thinking, computational thinking, and linguistic skills (Aljraiwi, 2019; Altaie and Jawawi, 2021; Haas et al., 2022; Holguin-Alvarez et al., 2022).

The authors underlined that the design of gamified activities should be based on the students' interests, which would increase enjoyment and lead to customization of learning. Despite these findings, more research is needed to understand how these elements can be more clearly integrated and enhanced in all dimensions of school commitment in order to achieve the expected academic outcomes while also taking into account students' needs and interests in a collaborative learning environment.

Similarly, the review demonstrates the direct relationship between motivation and participation with school engagement, even assuring that they are synonymous with academic success (Chen and Chiu, 2016; Hursen and Bas, 2019; Atin et al., 2022; González-Robles and Vázquez-Vílchez, 2022; Pearce, 2023). Therefore, although the implementation of gamification and video games in education has improved student motivation in primary education, secondary education, and even higher education, other authors claim that being motivated is not a predictor for achieving academic achievement and increasing student engagement (Hanghøj et al., 2018; Abd-Mutalib et al., 2019; Orhan Göksün and Gürsoy, 2019; Anunpattana et al., 2021; Veldkamp et al., 2022; Hejaili and Newbury, 2023).

Given the above, it is necessary to evaluate school engagement from a broader perspective and identify the other elements required to achieve the objectives proposed in the teaching and learning process. For future research, a more holistic view should be considered, including not only motivation and participation but also other factors and dimensions of school engagement. We should apply and evaluate these factors to observe the potential implications.

Teacher training is another key element considered in the research. Of the articles reviewed, only 3% focused on training teachers in gamification strategies, especially with a focus on the fact that implementing ramified strategies in the classroom can improve the levels of motivation and efficiency in student learning (Manassero-Mas and Vázquez-Alonso, 2023; Pearce, 2023). Other authors state in their results that teachers need to find a way to motivate their students and keep their attention while developing their social and cognitive skills (Hwang et al., 2015; Chen and Chiu, 2016; Pınar and Kaya, 2019; Cheng et al., 2023). This ratifies the lack of teacher training in gamification, which, according to the results of studies, is fundamental to positively impacting school engagement in the classroom (Sitra et al., 2017; Aljraiwi, 2019; Abenes et al., 2023; Hejaili and Newbury, 2023). These findings highlight the importance of training teachers in gamification strategies that allow them to design innovative activities that contribute to the development of student commitment, from the cognitive, behavioral, and attitudinal aspects, and then evaluate their impact on academic achievement.

The authors consider learning styles and cognitive styles as crucial aspects of the development of ramified strategies or gamification in the classroom. Recognizing that individual learning styles vary, scholars identify a deficiency in the literature concerning the customization of learning, the nature of assessment and feedback provided through gamification for student engagement, and the perceived lack of improvement in learning processes (Abd-Mutalib et al., 2019; Balaskas et al., 2023; Cheng et al., 2023). Similarly, using gamification in a single subject or developing it in a fractional manner

in the classroom turns it into a single knowledge domain activity, which does not allow for effective assessment or the appropriation of school engagement that truly benefits the student (Hanghøj et al., 2018; Zourmpakis et al., 2022; Liao et al., 2024).

The researchers also noted the application time and sample size when using ramified strategies. The researchers acknowledge the impact of the sample size on the obtained results and recommend increasing the size of the groups and extending the duration. The researchers affirm that the applicability times were too short to notice significant changes inside the classroom (Hwang et al., 2015; Khan et al., 2017; Çakiroglu et al., 2017; Jagušt et al., 2018; Oliveira and Cruz, 2018; Jones et al., 2019; Deng et al., 2020; Arévalo et al., 2022; Haas et al., 2022; Zourmpakis et al., 2022; Celis et al., 2023; Cheng et al., 2023; Chen et al., 2023; Sipone et al., 2023). What allows us to think that gamification cannot be a one-day activity or a few sessions is that it must be present in the daily life of the classroom to transform traditional teaching strategies and, in a transversal way, integrate various fields of knowledge for the scope of school engagement. In addition, learning requires educational practices that involve students across disciplinary boundaries in learning experiences that address real problems, allow the application of course content, and lead to personal growth (Groccia and Hunter, 2012, as cited in Groccia, 2018). "To achieve these outcomes, a student must engage with the learning process on behavioral, affective, and cognitive levels" (Groccia, 2018, p. 13).

In conclusion, researchers stressed the importance of having standardized or validated instruments that better measure and assess students' perceptions or outcomes against school engagement using gamification strategies (Lee and Irving, 2018; Aljraiwi, 2019; Garmen et al., 2019; Vázquez-Vílchez et al., 2021; González-Robles and Vázquez-Vílchez, 2022). Thus, teachers can use these instruments as a support tool to create ramified strategies, evaluate them, and provide feedback.

5 Conclusion

Although initially emerging in higher education, school engagement has become a fundamental concept in primary and secondary education. Kuh (2009) defines school engagement as the level of effort and involvement in productive learning activities. School engagement helps students to have greater persistence and satisfaction with their learning, thus achieving their educational goals. This review article analyzes research that has impacted school engagement using gamification strategies.

This analysis highlights the importance of promoting more research in countries where there are few or no studies in this field, which would make it possible to evaluate how school engagement behaves in different contexts. Furthermore, it is critical to address school engagement with gamification from all dimensions, not just motivation and participation, to provide a wide field of study for academics and practitioners interested in its development.

From this viewpoint, it is important to design ramified strategies that impact school engagement on the basis of students' learning and cognitive styles, personal growth, and application of the acquired knowledge. Consistent adoption of these strategies in teaching-learning practices will enable more effective evaluation and feedback. To get teachers to use ramified strategies more, they need to be trained on a regular basis to get rid of biases and

limitations that stop them from using game elements in the classroom. This will make it easier to make and use tools that help evaluate these strategies.

Author contributions

JR: Conceptualization, Data curation, Formal analysis, Investigation, Methodology, Resources, Software, Visualization, Writing – original draft, Writing – review & editing. AS: Conceptualization, Formal analysis, Funding acquisition, Investigation, Supervision, Validation, Writing – original draft, Writing – review & editing. OF: Funding acquisition, Supervision, Validation, Writing – review & editing.

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