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WHAT PREVENTS TEACHERS FROM GAMIFYING? BARRIERS TO TEACHER ADOPTION OF GAMIFICATION: A SYSTEMATIC LITERATURE REVIEW

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ABSTRACT

Gamification has emerged as a promising approach for enhancing student engagement, motivation, and learning; however, teacher adoption remains inconsistent across educational settings. This systematic literature review synthesizes empirical studies published between 2018 and 2023 to identify barriers to teacher adoption of gamification and examine professional development strategies proposed to address these challenges. Searches of Scopus, Web of Science, and ERIC yielded 1,247 records, of which 36 studies met the inclusion criteria. Findings revealed that barriers to adoption can be broadly categorized as personal, technical, pedagogical, and institutional factors. The most frequently reported barriers included lack of time, insufficient training, limited resources, technical difficulties, attitudinal resistance, low perceived usefulness, and administrative constraints. Professional development emerged as a promising mechanism for supporting adoption, although evidence regarding long-term effectiveness remains limited. Drawing on the Technology Acceptance Model, the review proposes an integrated framework for understanding teacher adoption of gamification and highlights the need for sustained, context-sensitive, and barrier-matched professional development models.

KEYWORDS: Prevents Teachers From Gamifying, Teacher Adoption Of Gamification.

1. INTRODUCTION

Gamification has emerged as a widely adopted instructional approach for enhancing student engagement, motivation, and learning across diverse educational settings. By incorporating game design elements such as points, badges, leaderboards, challenges, and feedback into non-game learning activities, gamification seeks to create more interactive and motivating educational experiences. Despite growing evidence supporting its educational potential, adoption among teachers remains inconsistent and often limited. Research suggests that teachers encounter a variety of barriers when attempting to implement gamification in their instructional practice. These barriers include lack of time, insufficient training, limited resources, technical difficulties, attitudinal resistance, and organizational constraints (Kaimara et al., 2021; Ragni et al., 2023; Marques & Pombo, 2021; Liu et al., 2023; Villa et al., 2023; Dahalan et al., 2023). Professional development initiatives have demonstrated potential for improving teacher competence and confidence; however, challenges related to sustainability, institutional support, and long-term implementation continue to be reported (Araújo & Carvalho, 2022; Villa et al., 2023; Wang & Xu, 2023). Although previous studies have examined barriers to gamification adoption in specific educational contexts, findings remain fragmented across educational levels, disciplines, and methodological approaches. Furthermore, much of the existing literature has focused on student outcomes rather than systematically synthesizing the factors that influence teacher adoption. Consequently, there is a need for a comprehensive review that consolidates current evidence regarding the barriers that prevent teachers from adopting gamification and the strategies proposed to address these challenges. This systematic literature review synthesizes empirical studies published between 2018 and 2023 to identify barriers to teacher adoption of gamification, examine professional development approaches designed to support implementation, and highlight directions for future research and practice.

2. Theoretical and Conceptual Background

2.1. Gamification in Education

Gamification has emerged as a prominent instructional approach for enhancing learner engagement, motivation, and participation across diverse educational settings. Broadly defined, gamification refers to the application of game design elements in non-game contexts to influence behavior, improve user experiences, and promote desired outcomes (Deterding et al., 2011; Zeybek & Saygı, 2023). In educational environments, gamification typically involves incorporating elements such as points, badges, leaderboards, levels, challenges, rewards, and feedback into existing learning activities and instructional platforms rather than transforming learning into a complete game experience (Khaldi et al., 2023; Saleem et al., 2021). It is important to distinguish gamification from game-based learning. Whereas game-based learning relies on the use of complete games designed or adapted for educational purposes, gamification incorporates selected game mechanics into traditional learning activities without requiring a fully developed game environment. This distinction is particularly relevant because the pedagogical requirements, implementation processes, and teacher competencies associated with these approaches may differ substantially. The use of gamification has expanded across a wide range of educational contexts, including K–12 education, higher education, language learning, science education, vocational education and training, and health professions education (Gaalen et al., 2020; Kalogiannakis et al., 2021; Khaldi et al., 2023). The increasing availability of digital learning technologies has further supported the integration of gamification into both face-to-face and online learning environments. As a result, gamification has become one of the most widely investigated approaches for enhancing engagement and participation in contemporary educational practice.

2.2. Educational Benefits and Challenges of Gamification

A substantial body of research suggests that gamification can positively influence learning processes and outcomes. Systematic reviews and meta-analyses have reported improvements in student motivation, engagement, participation, and academic performance across diverse educational settings (Li et al., 2023; Ratinho & Martins, 2023; Sailer & Homner, 2019). For example, Sailer and Homner (2019) reported positive effects on cognitive, motivational, and behavioral outcomes, while Li et al. (2023) found an overall positive effect of gamification on learning outcomes across multiple educational contexts. Similarly, Ratinho and Martins (2023) concluded that gamified learning strategies frequently contribute to increased student motivation and engagement.

Research has also demonstrated positive

outcomes in specific educational domains. In science education, gamification has been associated with improvements in learner motivation and participation (Kalogiannakis et al., 2021), while studies in health professions education have reported benefits related to learning behaviors, attitudes, and educational outcomes (Gaalen et al., 2020). Collectively, these findings suggest that gamification can support more interactive and engaging learning experiences when appropriately designed and implemented.

Despite these reported benefits, evidence regarding the effectiveness of gamification remains mixed. Several reviews emphasize that outcomes vary considerably depending on instructional design, implementation quality, learner characteristics, duration of intervention, and educational context (Kalogiannakis et al., 2021; Li et al., 2023). Researchers have also noted that many gamification initiatives rely heavily on points, badges, and leaderboards while devoting less attention to deeper pedagogical integration and theoretically grounded design approaches (Khaldi et al., 2023).

Furthermore, concerns have been raised regarding the sustainability of motivational gains. Although gamified interventions often produce short-term increases in engagement and participation, these effects may diminish over time due to novelty effects or excessive reliance on extrinsic rewards (Ratinho & Martins, 2023). Critical reviews have also highlighted the need for stronger theoretical foundations and more rigorous evidence regarding long-term educational impacts (Dichev & Dicheva, 2017). Consequently, successful implementation depends not only on the selection of game elements but also on teachers' ability to design, manage, and integrate gamified experiences effectively.

2.3. Technology Acceptance Model and Teacher

Adoption of Gamification Understanding why teachers choose to adopt or reject gamification requires consideration of established technology adoption theories. Among these, the Technology Acceptance Model (TAM) is one of the most widely applied frameworks for explaining educators' acceptance and use of digital technologies (Granić & Marangunić, 2019). TAM proposes that technology adoption is primarily influenced by two key beliefs: perceived usefulness and perceived ease of use. These beliefs shape attitudes toward a technology, which subsequently influence behavioral intentions and actual usage. Perceived usefulness refers to the extent to which teachers believe that a technology can improve teaching effectiveness or student learning outcomes. Within gamified learning environments, perceived usefulness is often associated with increased student engagement, motivation, participation, and learning performance. Research consistently identifies perceived usefulness as one of the strongest predictors of teachers' intentions to adopt gamified tools. Vanduhe et al. (2020) found that perceived usefulness was a critical factor influencing instructors' continuance intentions to use a gamified Moodle platform, while Turan et al. (2022) reported that perceived usefulness significantly influenced pre-service teachers' attitudes toward gamification tools and subsequently their behavioral intentions. Perceived ease of use refers to the extent to which individuals believe that a technology can be used with minimal effort. In educational settings, this construct reflects teachers' perceptions of the complexity associated with learning, implementing, and managing gamified instructional tools. Previous research suggests that perceived ease of use contributes to adoption both directly and indirectly by shaping positive attitudes and enhancing perceptions of usefulness (Turan et al., 2022; Vanduhe et al., 2020). Teachers are generally more willing to adopt gamification when tools are intuitive, accessible, and compatible with existing instructional practices. Many of the barriers reported in the literature can be interpreted through the lenses of perceived usefulness and perceived ease of use. Concerns regarding educational value, curriculum alignment, and instructional effectiveness may reduce perceived usefulness, whereas insufficient training, technical difficulties, limited resources, and lack of institutional support may reduce perceived ease of use. Consequently, TAM provides a useful theoretical framework for understanding how personal, technical, pedagogical, and institutional barriers influence teachers' adoption decisions. Accordingly, the present review adopts TAM as a conceptual lens for interpreting barriers to teacher adoption of gamification. From this perspective, barriers influence adoption by shaping teachers' perceptions of usefulness and ease of use, which subsequently affect their intentions and actual implementation of gamified practices.

2.4. Research Gap and Purpose of the Review

Despite the growing body of research demonstrating the potential of gamification to enhance student motivation, engagement, and learning outcomes, its adoption by teachers remains inconsistent across educational settings. Existing

reviews have predominantly focused on the effectiveness of gamification, learner outcomes, instructional design, or implementation within specific disciplines and contexts (Gaalen et al., 2020; Kalogiannakis et al., 2021; Khaldi et al., 2023; Li et al., 2023; Ratinho & Martins, 2023). Consequently, considerably less attention has been devoted to understanding the factors that prevent teachers from adopting gamification in their everyday instructional practice. Although individual studies have reported numerous barriers, including limited time, insufficient training, technological constraints, resource limitations, and organizational challenges, the evidence remains fragmented across educational levels, subject areas, and methodological approaches. As a result, there is currently no comprehensive synthesis that systematically consolidates the barriers influencing teacher adoption of gamification while simultaneously examining the professional development strategies proposed to address them.

This gap is particularly significant because teachers play a central role in the successful implementation of gamified learning environments. Even the most effective gamification designs cannot produce meaningful educational benefits if educators lack the knowledge, confidence, resources, or institutional support necessary for adoption. Understanding why teachers choose to adopt, adapt, or reject gamification is therefore essential for translating evidence of effectiveness into sustainable educational practice. Accordingly, this systematic literature review synthesizes empirical studies published between 2018 and 2023 to identify the barriers that influence teacher adoption of gamification, examine professional development approaches designed to overcome these barriers, and propose a conceptual framework for understanding adoption through the lenses of perceived usefulness and perceived ease of use.

To address these objectives, the review was guided by the following research questions: RQ1. What barriers influence teachers' adoption and implementation of gamification in educational settings? RQ2. What professional development approaches have been reported to support teacher adoption of gamification and address identified barriers? RQ3. How can the Technology Acceptance Model (TAM) be used to interpret the barriers influencing teacher adoption of gamification? RQ4. What gaps remain in the literature regarding teacher adoption of gamification and the effectiveness of interventions designed to support implementation?

3. METHODS

3.1. Review Protocol

This systematic literature review was conducted in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA 2020) guidelines (Page et al., 2021). A review protocol was developed prior to the commencement of the study to guide the search, screening, data extraction, and synthesis processes. Although the protocol was not formally registered, all stages of the review followed a predefined procedure designed to enhance transparency and methodological rigor.

3.2. Search Strategy

A systematic search was conducted across three major educational and multidisciplinary databases: Scopus, Web of Science, and ERIC (via EBSCOhost). These databases were selected because of their extensive coverage of educational technology, teacher education, and gamification research. The search was limited to peer-reviewed journal articles, conference proceedings, and doctoral dissertations published in English between January 2018 and December 2023. Search terms were developed based on three key concepts: (a) teachers and educators, (b) gamification and game-based learning, and (c) barriers, challenges, and professional development. The following search string was adapted as necessary to meet the requirements of individual databases: (teacher* OR educator* OR instructor* OR faculty) AND (gamification OR "game-based learning" OR "digital games") AND (barrier* OR challenge* OR obstacle* OR difficulty* OR "professional development" OR "teacher training" OR "staff development") To reduce the possibility of omitting relevant studies, backward snowballing was conducted by examining the reference lists of all included articles.

3.3. Eligibility Criteria

Studies were included if they:

- Focused on pre-service or in-service teachers in K–12 or higher education settings.
- Examined barriers, challenges, or obstacles related to the adoption or implementation of gamification.
- Reported professional development, training, or support initiatives related to teacher gamification competencies.
- Employed qualitative, quantitative, mixed-methods, or systematic review designs.
- Were published in English between 2018 and 2023.

Studies were excluded if they:

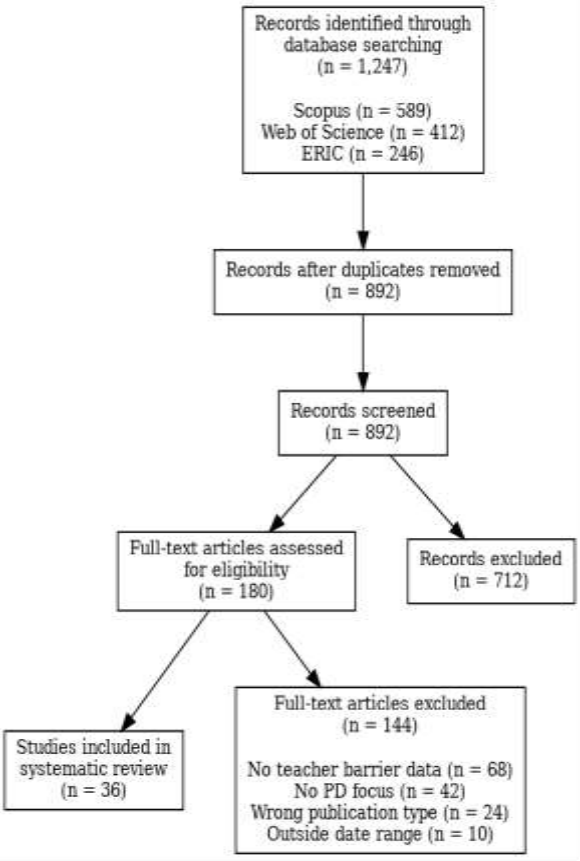
- Focused exclusively on student perceptions or outcomes without teacher-related data.
- Examined serious games without explicit gamification elements.
- Were editorials, commentaries, opinion papers, book reviews, or conceptual papers lacking empirical evidence.
- Were published outside the specified review period.

3.4. Study Selection

All retrieved records were imported into a reference management system and screened for duplicates. The screening process was conducted in two stages. First, titles and abstracts were reviewed to remove clearly irrelevant studies. Second, full-text articles were assessed against the predefined inclusion and exclusion criteria. Reasons for exclusion at the full-text stage were documented to ensure transparency.

Figure 1 presents the PRISMA flow diagram summarizing the study identification, screening, eligibility assessment, and inclusion process.

Figure 1: PRISMA 2020 flow diagram illustrating study identification, screening, eligibility assessment, and final inclusion.



3.5 Data Extraction

A standardized data extraction form was developed in Microsoft Excel to ensure consistency throughout the review process. For each study, the following information was recorded: authors, publication year, country, educational level, participant characteristics, sample size, research design, reported barriers to gamification adoption, professional development strategies, and key findings.

3.6 Data Synthesis

A thematic synthesis approach was used to analyze barriers to teacher adoption of gamification. Reported barriers were extracted, coded, and iteratively grouped into broader categories. Through this process, barriers were organized into personal, technical, pedagogical, and institutional dimensions. Professional development strategies were synthesized narratively. Particular attention was given to the types of professional development provided, the barriers they were intended to address, and any reported evidence regarding their effectiveness in supporting teacher adoption of gamification.

3.7 Trustworthiness and Reliability

To enhance transparency, inclusion and exclusion decisions were documented throughout the screening process. Coding categories were refined iteratively through repeated review of extracted data to ensure consistency and coherence in the thematic synthesis.

4. RESULTS

4.1 Key Barriers Identified

Analysis of the 36 included studies revealed several recurring barriers that limit teachers' adoption and implementation of gamification. The most frequently reported challenges were lack of time, insufficient training, limited resources, technical difficulties, attitudinal resistance, fear of classroom disruption, low perceived usefulness, and institutional constraints. These barriers were subsequently organized into four overarching categories: personal, technical, pedagogical, and institutional barriers.

Time-related constraints emerged as one of the most consistently reported barriers across the literature. Teachers frequently indicated that the design, preparation, and implementation of gamified activities require substantial time investments that are often difficult to accommodate within existing

workloads (Kaimara et al., 2021; Ragni et al., 2023; Liu et al., 2023; Martí-Parreño et al., 2023; Lopes & Teixeira, 2022; Tootian, 2022).

Closely related to this issue was the lack of sufficient professional development opportunities. Many educators reported limited access to training that would enable them to develop the pedagogical and technical competencies necessary for effective gamification implementation (Araújo & Carvalho, 2022; Marques & Pombo, 2021; Ragni et al., 2023; Tootian, 2022; Villa et al., 2023).

Technical and resource-related barriers were also widely reported. Several studies identified inadequate access to educational technologies, software, equipment, and reliable internet connectivity as factors constraining implementation efforts (Liu et al., 2023; Lopes & Teixeira, 2022; Ragni et al., 2023). In addition, teachers frequently expressed concerns regarding their own technological skills and their ability to troubleshoot technical problems that may arise during gamified learning activities (Gunnars et al., 2021; Villa et al., 2023).

Beyond practical constraints, attitudinal and psychological barriers emerged as important determinants of adoption. Some educators expressed skepticism regarding the educational value of gamification, questioned its compatibility with curricular goals, or demonstrated reluctance to modify established instructional practices (Dahalan et al., 2023; Hicks, 2022; Kaimara et al., 2021; Palmquist, 2021). Other studies highlighted concerns that gamified activities could lead to classroom management difficulties, excessive competition among students, or loss of instructional control (Greaves & Vlachopoulos, 2023; Manrique & López, 2022). Similarly, several studies reported that low perceived usefulness reduced teachers' willingness to adopt gamification, particularly when educators were unconvinced that gamified approaches would improve student learning outcomes (Kılıç & Uzun, 2023; Martí-Parreño et al., 2023).

Finally, institutional barriers were frequently identified as obstacles to implementation. These included rigid curricular structures, limited administrative support, insufficient funding, and organizational policies that restricted innovation in teaching practices (Dahalan et al., 2023; Information Resources Management Association, 2022; Kaimara et al., 2021). Collectively, these findings suggest that teacher adoption of gamification is influenced by a complex interaction of personal, technical, pedagogical, and institutional factors rather than by any single barrier in isolation.

4.2 Teacher Attitudes and Experience

Teachers with more experience in digital tools or gaming tend to implement more complex gamified activities; conversely, less experienced teachers report feeling unprepared or lacking creativity (Liu et al., 2023; Villa et al., 2023). Positive attitudes toward GBL are common but often coexist with perceptions that it is demanding or difficult to align with curricular goals (Marques & Pombo, 2021; Villa et al., 2023). Pre service teachers, in particular, express concerns about their own game literacy and pedagogical integration skills (Kaimara et al., 2021; An, 2018; Nousiainen et al., 2018). The Technology Acceptance Model (TAM) has been used to show that perceived usefulness and perceived ease of use significantly predict teachers' intention to adopt gamification (Kılıç & Uzun, 2023; Tootian, 2022).

4.3 Professional Development Initiatives

The reviewed literature consistently identified professional development (PD) as a critical mechanism for addressing barriers to teacher adoption of gamification. Across studies, PD initiatives were designed not only to improve teachers' technical competencies but also to strengthen pedagogical understanding, increase confidence, and enhance perceptions of the value of gamified instruction.

Several studies emphasized the importance of structured training programs that introduced educators to the principles of gamification, common game elements, and strategies for integrating gamified activities into existing curricula (Araújo & Carvalho, 2022; Villa et al., 2023). These initiatives frequently combined theoretical foundations with practical application opportunities, allowing teachers to design, implement, and evaluate gamified learning activities within authentic educational contexts.

A second theme involved ongoing support mechanisms rather than one-time training events. Mentoring, peer collaboration, professional learning communities, and follow-up coaching were frequently reported as effective approaches for sustaining implementation efforts and helping teachers overcome challenges encountered during practice (Marques & Pombo, 2021; Wang & Xu, 2023). Such approaches were particularly valuable in addressing technical difficulties, building confidence, and encouraging experimentation with new instructional methods.

Several studies also highlighted the importance of context-sensitive professional development. Rather than adopting generic training models, successful initiatives were tailored to teachers' subject areas,

technological readiness, institutional contexts, and prior experience with gamification (Villa et al., 2023; Ragni et al., 2023). This flexibility enabled professional development programs to address barriers more directly and increase the likelihood of successful adoption.

Despite the generally positive outcomes reported, the literature suggests that professional development alone is insufficient to ensure widespread adoption. Many barriers identified in the reviewed studies, including limited time, inadequate resources, and institutional constraints, require organizational and policy-level support in addition to teacher training. Consequently, the most effective approaches appear to combine sustained professional development with broader institutional efforts aimed at creating supportive conditions for implementation.

4.3. Discussion

4.3.1. Interpretation of Findings Through TAM

The purpose of this review was to synthesize evidence regarding the barriers that prevent teachers from adopting gamification and to examine professional development approaches designed to address these challenges. The findings indicate that teacher adoption is influenced by a complex interaction of personal, technical, pedagogical, and institutional factors. Although educators generally recognize the potential of gamification to increase student engagement and motivation, numerous barriers continue to limit widespread implementation across educational contexts.

One of the most prominent findings concerns the persistence of time-related constraints and insufficient training. Across the reviewed studies, teachers consistently reported that designing, implementing, and evaluating gamified learning activities requires considerable effort and preparation. These findings suggest that adoption is not solely a question of willingness but also of capacity. Even when teachers express positive attitudes toward gamification, limited time and insufficient professional preparation may prevent implementation. Similar concerns have been reported across both K–12 and higher education settings, indicating that these barriers are not confined to a particular educational sector.

The findings also highlight the importance of technical and resource-related factors. Limited access to technology, inadequate infrastructure, and insufficient digital competencies continue to constrain implementation efforts. These challenges are particularly significant because they directly affect teachers' ability to experiment with and sustain gamified practices. In many cases, technical barriers appear to interact with other obstacles, reinforcing uncertainty and reducing confidence in implementation.

Pedagogical barriers emerged as another important theme. Several studies reported concerns regarding classroom management, curriculum alignment, and the educational value of gamification. Some teachers questioned whether gamified activities could achieve meaningful learning outcomes, while others expressed concerns about increased competition, student distraction, or loss of instructional control. These findings suggest that successful adoption depends not only on access to technology but also on teachers' confidence in the pedagogical legitimacy of gamification as an instructional approach.

Institutional factors were similarly influential. Limited administrative support, insufficient funding, rigid curricular structures, and organizational constraints frequently restricted teachers' ability to adopt innovative teaching practices. The findings therefore suggest that responsibility for adoption cannot be placed solely on individual teachers. Rather, successful implementation requires supportive institutional environments that provide adequate resources, flexibility, and encouragement for pedagogical innovation.

The Technology Acceptance Model (TAM) provides a useful lens for interpreting these findings. Many of the barriers identified in this review can be understood as factors that reduce either perceived usefulness or perceived ease of use. For example, skepticism regarding educational value and curriculum alignment may reduce perceived usefulness, whereas lack of training, technical difficulties, and resource limitations may reduce perceived ease of use. From this perspective, teacher adoption is unlikely to increase unless both dimensions are addressed simultaneously. Interventions that focus exclusively on technical skills may fail if teachers remain unconvinced of the educational value of gamification, while evidence of effectiveness alone may be insufficient when implementation is perceived as overly complex or resource intensive.

Figure 2: Conceptual interpretation of teacher adoption barriers through the Technology Acceptance Model (TAM).

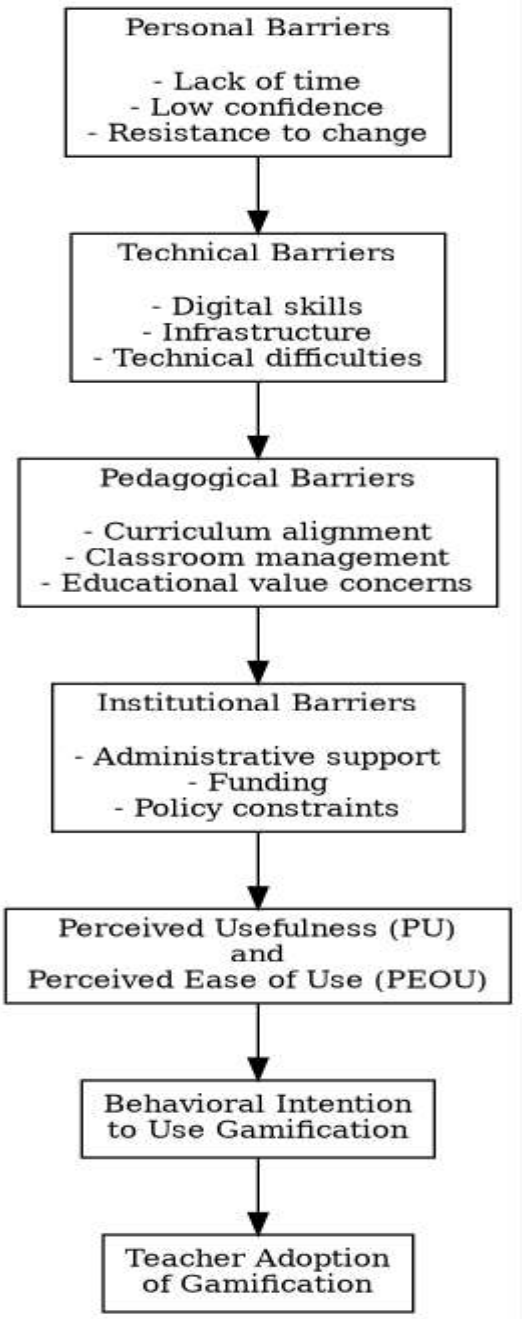


Figure 2 illustrates how the barriers identified in this review may influence adoption through perceived usefulness and perceived ease of use. The model highlights the interconnected nature of these barriers and suggests that effective interventions should address multiple dimensions simultaneously rather than focusing on a single challenge in isolation.

Table 1: Summary of Major Barriers to Teacher Adoption of Gamification.

Barrier Category	Representative Barriers	Implications for Adoption	Representative Studies
Personal	Lack of time, resistance to change, low confidence	Reduces willingness and readiness to implement gamification	Kaimara et al., 2021; Ragni et al., 2023; Palmquist, 2021
Technical	Limited digital skills, technical difficulties, inadequate infrastructure	Increases implementation complexity and reduces confidence	Liu et al., 2023; Gunnars et al., 2021; Lopes & Teixeira, 2022
Pedagogical	Classroom management concerns, curriculum alignment, uncertainty about learning benefits	Reduces perceived usefulness and instructional fit	Martí-Parreño et al., 2023; Greaves & Vlachopoulos, 2023; Kılıç & Uzun, 2023
Institutional	Limited funding, insufficient administrative support, restrictive policies	Constrains innovation and long-term implementation	Dahalan et al., 2023; Information Resources Management Association, 2022; Kaimara et al., 2021

4.4. Implications for Professional Development and Practice

The findings highlight the importance of sustained and context-sensitive professional development. Effective professional development extends beyond one-time workshops and includes ongoing mentoring, collaboration, coaching, and opportunities for practical implementation. Several studies emphasized the value of professional learning communities and peer-support networks in helping teachers develop confidence and overcome implementation challenges.

The reviewed evidence further suggests that professional development initiatives should be tailored to the specific barriers experienced by teachers. For example, teachers experiencing technical challenges may benefit from hands-on training and technical support, whereas teachers expressing doubts about educational value may require opportunities to observe successful classroom implementations and review evidence demonstrating learning outcomes. Such barrier-specific approaches may be more effective than generic training programs that assume all teachers face similar challenges.

However, professional development alone is unlikely to eliminate all barriers. Organizational support, policy alignment, adequate funding, and access to appropriate technologies remain essential

components of successful implementation. Consequently, institutions seeking to expand gamification adoption should consider combining teacher training initiatives with broader organizational strategies designed to create supportive conditions for innovation.

Table 2: Professional Development Approaches Reported in the Literature.

Professional Development Approach	Intended Purpose	Barriers Addressed	Reported Outcomes
Workshops and training programs	Develop foundational gamification knowledge and skills	Lack of training, low confidence	Improved teacher competence and readiness
Hands-on design activities	Build practical implementation skills	Pedagogical uncertainty, implementation difficulties	Increased confidence and classroom application
Mentoring and coaching	Provide individualized support during implementation	Technical and pedagogical barriers	Greater persistence and problem-solving capacity
Professional learning communities	Facilitate peer learning and knowledge sharing	Isolation, resistance to change	Increased collaboration and exchange of best practices
Context-specific training	Align professional development with local needs and curriculum	Perceived usefulness, curriculum fit	Greater relevance and adoption potential

4.5. Future Research Directions

Despite the growing body of literature on gamification in education, important gaps remain. Most studies focus on identifying barriers rather than evaluating long-term solutions. In particular, there is limited evidence regarding the sustainability of professional development interventions and their long-term impact on teacher adoption. Future studies should therefore examine whether improvements in teacher confidence and competence are maintained over time and whether these gains translate into sustained classroom implementation.

The review also revealed limited investigation of policy-level and institutional influences. While administrative support and organizational constraints were frequently mentioned as barriers, relatively few studies examined how policies, leadership practices, funding mechanisms, and institutional cultures shape adoption decisions. Additional research in these areas may provide valuable insights into how educational systems can better support innovation. Finally, although the Technology Acceptance Model provides a useful framework for understanding adoption, relatively few studies have explicitly examined how interventions influence perceived usefulness and perceived ease of use. Future research should investigate whether barrier-specific interventions can effectively improve these perceptions and whether such improvements lead to greater adoption and long-term implementation of gamified teaching practices.

Table 3: Research Gaps and Directions for Future Research.

Research Area	Current State of Evidence	Future Research Need
Long-term effectiveness of professional development	Most studies assess short-term outcomes immediately following interventions	Longitudinal studies examining sustained adoption and implementation
Policy and institutional influences	Limited empirical investigation of policy-level barriers	Studies examining leadership, funding, and policy mechanisms that support adoption
Barrier-specific interventions	Few studies tailor interventions to specific barriers	Comparative evaluations of targeted versus generic professional development approaches
Teacher adoption across contexts	Evidence fragmented across educational levels and disciplines	Cross-context comparisons examining contextual influences on adoption
TAM and gamification adoption	Initial evidence supports the role of perceived usefulness and ease of use	Empirical testing of TAM-based intervention frameworks for teacher adoption

5. CONCLUSION

This systematic review synthesized evidence from studies published between 2018 and 2023 to identify barriers that hinder teacher adoption of gamification and game-based learning and to examine professional development approaches designed to address these challenges. The findings indicate that teacher adoption is constrained by a combination of personal, technical, pedagogical, and institutional barriers. Among these, time constraints, insufficient training, limited resources, technical difficulties, attitudinal resistance, concerns regarding classroom management, and low perceived usefulness emerged as the most frequently reported obstacles.

The findings further suggest that professional development can play an important role in supporting adoption, particularly when it is

sustained, context-sensitive, and accompanied by opportunities for collaboration and practical application. However, professional development alone is unlikely to overcome all barriers. Successful implementation requires coordinated support at multiple levels, including adequate resources, administrative commitment, supportive policies, and institutional cultures that encourage pedagogical innovation.

The Technology Acceptance Model provides a useful framework for understanding the barriers identified in this review. Many of the challenges reported in the literature can be interpreted as factors that reduce teachers' perceptions of usefulness and ease of use, thereby limiting their willingness to adopt gamified approaches. Consequently, future interventions should address both dimensions simultaneously by demonstrating educational value while also reducing implementation complexity.

Despite the growing body of research on gamification in education, important gaps remain. Future studies should investigate the long-term effectiveness of professional development initiatives, examine the influence of institutional and policy-level factors on adoption, and evaluate barrier-specific intervention models that target particular teacher needs. Greater attention to longitudinal and context-sensitive research designs will help strengthen understanding of how gamification can be sustainably integrated into educational practice.

Overall, while teachers generally recognize the potential of gamification and game-based learning to enhance student engagement and learning, widespread adoption will depend on addressing the interconnected barriers identified in this review through coordinated efforts at the individual, institutional, and policy levels.

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