

The Level of Teachers' Readiness and Challenges in Implementing Gamification

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ABSTRACT

This study presents a systematic literature review on the level of teachers' readiness and the challenges faced in implementing gamification in the context of education. Gamification is an interactive approach to teaching and learning. This strategy is proven to increase students' interest, motivation and involvement in learning. As the use of gamification in teaching and learning continues to increase, understanding the level of teachers' readiness and the key obstacles they face to implement is essential to have a successful implementation. This research is grounded in the PRISMA framework and analyzes the journal articles published between year 2020 and 2025 from the databases such as DOAJ, Ebasco, Eric, Frontiers, Proquest, SciDirect, Web of Science, Springer, ResearchGate and Scopus. This review is conducted to answer the following questions about the level of teachers' readiness in implementing gamification in education and the key challenges faced by teachers in implementing gamification across various contexts and teaching environments. The results indicate that varying levels of teachers' readiness are influenced by factors such as skills, knowledge and access. Teachers' readiness towards gamification is not uniform and reflects mixed perceptions. Key challenges include unstable internet connection, technical constraints, time constraints, lack of resources and limited professional skills training in gamification are identified. On the other hand, this review reveals crucial gaps in existing research and offers suggestions for further research and policy development to enhance the implementation of gamification in education.

Keywords: gamification; teachers' readiness; challenges; education

INTRODUCTION

Technological advancements developed at a fast pace have significantly affected multiple domains with education being one of the most influenced fields. Malaysia's educational framework is progressively integrating technology into its teaching and learning methodologies. The Ministry of Education Malaysia (KPM) stresses Information and Communication Technology (ICT) usage in educational curricula under the Malaysian Education Development Plan (PPPM) 2013–2025 to prepare students and teachers with necessary future skills (Nur Aisyah Kamaluddin & Hazrati Husnin, 2023). Malaysia is progressing toward digital education through its initiative which emphasizes technology applications like gamification, Artificial Intelligence (AI), and big data to build an innovative education system.

The Malaysia Digital Economy Blueprint (MyDIGITAL) introduced in 2021 identifies AI as a transformative force within Malaysian educational sectors. Lo Khai Yi and Ainaa Mazel (2021), stated that the objective is to improve educational experiences for both teachers and students by integrating digital innovations. National policies push educational institutions toward adopting AI-based technologies through AI-based gamification which boosts student engagement and personalized learning.

Gamification, an innovative teaching approach that combines game mechanics with smart technology to enhance student engagement and motivation. Research consistently shows that gamification not only enhances students'

engagement but also facilitates the process of making learning more accessible and enjoyable (Dyah Retno Wulan et al., 2024). However, the success of implementation of gamification in educational settings largely depends on the willingness and readiness of the teacher to adopt this transformative approach. The initiatives to integrate it in the teaching process may not fulfil the expectations without adequate knowledge, skills and confidence to utilize this technology effectively. Furthermore, the teachers face numerous challenges including lack of training, technical difficulties, and time constraints.

Recognizing the importance of these issues, this study was designed to organize and analyse existing research studies on the level of teachers' readiness and the challenges they encounter in implementing gamification. The systematic literature review approach used to obtain a comprehensive picture of the current landscape and identify the gaps in existing knowledge. This research has the potential to empower teachers and ultimately transform the educational experience for students.

Research objectives

1. To analyse systematically the level of teachers' readiness in implementing gamification in education.
2. To identify the key challenges faced by teachers in the implementation of gamification across various contexts and teaching environments.

Research questions

1. What's the level of teachers' readiness in implementing gamification in education?
2. What are the key challenges faced by teachers in implementing gamification across various contexts and teaching environments?

LITERATURE REVIEW

Several studies highlight the main aspects of gamification.

Gamification

With the increasing comfort in the use of technology, gamification has been used as a continuous search for the motivation and development of this concept in several areas such as business, education, health, media, social issues. Gamification is part of everyday life in several forms. The first gamification was introduced by Nick Pelling in 2002 and attracted academic attention after 8 years in 2010 (Sharma & Sharma, 2023).

According to Zanina Kirovska et al., (2020), who researched the concept of gamification in modern recruitment trends, saying global forecasts and trends for gamification implementation would be expected to be more than threefold for the period between 2020 and 2025. The main advantages of gamification are increasing motivation, interaction, and individual participation, and the core ideas come from human desire, solving problems. For example, students in the classroom are often tired and bored, but if teachers recommend playing games together instead of listening to lessons, they will be motivated quickly and most of their fatigue will be lost.

Therefore, by using gamification, routine and boring life activities can be presented to individuals in the form of challenges and issues that involve and entertain, and involve them, gamification is the use of game design elements in non -game environments. Aryo Kusuma Yanija et al. (2020), defines gamification as a system that makes players bound in artificial conflicts, interpreted by certain rules, and produces measurable results. In general gamification is said to be a hidden game building in the real-world environment.

In addition, the theory of gamification lists the terms of gamification where the use of this design is expanded in education. These gamifications have terms such as educational games, game design, dynamic games, game elements, game mechanisms, identified rules, extrinsic motivation, integrated motivation, intrinsic motivation,

controlled motivation, leading boards, medals, motivational points, determining theory, self-efficacy theory, flow theory, and serious games (Fitri Marisa et al., 2022). The research on the component of gamification is a product, process or experience of thinking that is involved in the game elements to solve non -game problems. Moreover, gamification has a variety of components used as elements. This element focuses on the way the game is designed and used instead of the whole game.

In addition, this element is to advance engagement and enjoyment of solving problems in non -game contexts. These elements also provide experiences or systems aimed at motivating and engaging users, just like how video games involve their players. So basically, the game has several kinds of challenges, rules that people choose to follow, feedback and interactions, and emotional reactions, generally fun. Some researchers list elements that are widely used to design gamification in their own context. These elements are divided into several components such as game mechanisms and game dynamics. The game mechanism contains points, levels, challenges, virtual items, leaders, badges, gifts, avatars and tasks while game dynamics contains rewards, status, achievement, feedback, competition, publicity and narrative (Bayu Rima Aditya et al., 2023; Diana Ariani, 2020). Another aspect that needs to be considered in gamification is the player participation model. Some of the methods used are voluntary, compulsory or through the selection process and reward certain players. These elements provide a clear sense of achievement and understanding of consumer progress by increasing the overall impact of gamification.

Gamification in Education

The success of an educational institution depends on the quality of teaching of educators. Educators use a variety of teaching methods to stimulate student learning. In this context, gamification is one of the most used approaches to improve the teaching and learning process by helping both teachers and students achieve their goals in the short, medium and long term. According to Nurkaliza Khalid (2023), this gamification approach is different from the conventional learning method in which the theory of constructivism emphasizes that the educators act as facilitators while students will think and strive to build knowledge without receiving it passively. Pupils will strive to complete a task or activity through their own efforts as well as through social relationships with friends and teachers.

This statement is supported by the findings of the study of Rahimah Wahid, 2020, using mechanical games, educational practices can be through traditional learning transitions in college format to more interactive and engaging activities. The researcher also thinks gamification can motivate students, stimulate interest and give players an exciting experience. The approach of gamification in this learning is seen as more focused on the theory of constructivism, the theory that supports learning practices through student centralization. This theory encourages students to actively engage and experience hands-on learning experiences.

The gamification approach emphasizes the motivation of student motivation. This is because motivation is a major challenge that needs to be addressed as it can influence one's desire and ability to master a language. As found in the study of Siti Rohani Jasni et al. (2022), found that gamification in Arabic integrated devices had a positive impact on students. This is because this approach makes learning fun and interactive, making students enjoy learning and discover more about unity in Arabic. In addition to Arabic, Mandarin language teachers also have problems with students less interested in compulsory courses, especially Mandarin. Chee Kai Yen et al. (2020), thinks students are interested and enjoy taking a Mandarin language class run by gamification method. Students also love the guidance of the facilitators during the learning session. This statement shows students' perception and acceptance of gamification methods as a learning method in Mandarin language courses. In this regard, studies that study the effectiveness of Quizizz games in teaching in learning, proving that most students agree and are willing to accept when teachers use appropriate methods and techniques such as gamification to achieve learning objectives and develop effective teaching and learning processes.

These researchers also explained that gamification activities will contribute to the increase in student competence and to make statements about improving learning motivation, teamwork and learning strategies as well as educators' creativity. (Ho Sing Ho et al., 2022; Nor Aidawati et al., 2021). Furthermore, Mohd Fikruddin Mat Zin et al., 2021, argues that gamification is one of the approaches in 21st Century Learning (PAK21) that uses interactive game methods in the learning and facilitating process that attract students' interest in the teaching and

learning process. In addition, teachers tend to implement gamification strategies because they have the perception that gamification applications can help attract, increase student confidence and motivation during the teaching and facilitating process. Teachers have shown a positive tendency for existing applications provided by the Ministry of Education Malaysia who support gamification strategies. This statement is in line with the systematic review of Angela Pao Sheng Mei and Shahlan Surat (2021), explaining that teachers are willing to continue using gamification in future teaching and learning. As stated by Fathi Abdullah and Khadijah Abdul Razak (2021), educators or lecturers are aware of many things about online games like Kahoot! Quizizz, Quizlet, Wordwall, and Qimkit which interest students to learn the content of the subject. This is because the level of interest and acceptance of primary school students in this approach is positive and enhances students' academic performance in the field of Islamic education.

In addition, these gamification materials have good value in terms of colour, animation, graphics, and appropriate navigation buttons can help students improve their interest in using these gamification materials (Azita Ali et al., 2021). This is why mathematical teaching will be more interesting if there is a use of multimedia materials so that interactions between teachers and students and students and teaching materials are properly and effectively. The use of teaching aids based on technology -based gamification in teaching helps students to better remember learning facts. The findings of Hazrati Yahaya et al. (2022), show that gamification integration in learning has a positive impact on students' emotions. In addition to sparking students' fun, this approach has successfully created healthy competition between students during the learning process. Moreover, students can access the game at a time and place that meets their own needs, not limited during the teaching and learning process. The use of gamification to develop English language skills in various fields such as vocabulary, grammar, and writing raises the question of whether students and teachers are in favour of this learning in the same way. On the use of digital technology such as games and game chat rooms to develop English language skills (listening, talking, writing, vocabulary and reading) explores whether there are differences in the use of technology as language learning assistance by students and teachers. Researchers have found that there is no significant difference between teachers and students in the use of digital technology for teaching and learning these five critical skills.

Overall, gamification has a huge impact on the teacher and has made teachers more accepting of this platform. Teachers' belief in the effectiveness of gamification as a change agent can motivate and change the thinking of various segments of society in the field of education. In addition, students are not calculated from primary schools until higher education institutions receive a good approach to gamification where this approach can enhance key aspects such as interest, motivation, student engagement in learning. Many researchers recommend the interactivity aspects of technology integration as a gamification as a strategy or method of teaching and learning especially in subjects that are said to be difficult to understand. Gamification and the use of game design elements have a promising future, especially post -covid, when students and teachers are better trained in the use of various digital educational tools and more computer literacy.

Benefits of implementing Gamification in Education

Gamification is an effective approach to teaching as it could bring positive changes to the students' attitude and behaviour towards learning. It affects the students' achievement in education and increases positive impact on educational contexts. Gamification atmosphere helped students to sustain their interest and easily manage the challenging task. According to Caponetto (2020), students found gamification made learning more enjoyable and engaging. This statement is aligned with Nousiainen et al. (2021), who stated that gamification fosters students' creativity, imagination and enjoyment. Research of Norshilawani and Muhammad Fariz (2024), agrees with them as the fun element in gamification makes students more eager to learn and concentrate during learning sessions. They agreed gamification tends to lower the students' anxiety facing the assessment. On the other hand, this gamified learning environment offers an opportunity to take risks and deepen the students' educational understanding without the fear of failure (Rachna Sorot & Ruchika Tuli, 2024).

Furthermore, researchers prove gamification in education enhances students' skills such as, cognitive skills, critical thinking, problem solving, development of complex thinking, support of multidisciplinary learning, and cooperative learning (Alsulaimani, 2022; Gilyazova & Zamoshchanskii, 2020), as it is implemented at all levels

of education like preschool, primary, secondary and tertiary level. Lamrani & Abdelwahed (2020), who conduct research on multiple levels of education backgrounded students, stated that gamified activities aim to bolster cognitive and motor skills of preschoolers like pattern recognition, sorting and matching. They even added that this environment encourages interpersonal skills and cooperative acts among them. Moreover, gamification shows visible learning goals, and the context represents the real- world situations or problems, whereas it keeps developing skills through simulations (Hu, 2020). These experiences involve collaboration and teamwork in the process of building their knowledge to achieve a common goal (Rohman & Fauzati, 2022; Zahra Sonia, 2020). This sense of community gives students a social responsibility and emotional investment though interactive gamification contexts.

In addition, gamification in education provides a flexible student-centred learning environment that encourages students to achieve their full potential towards their learning goals. Besides academic pursuits, another important aspect that amplifies the learning experiment is the feedback mechanism. Ana Vrcelj et al. (2023) added their view on this mechanism as it offers timely insights to students to polish further attention to their learning. Bitu Mirzae et al. (2022), supports this statement as students will have an easier learning process through instant feedback as they don't need to search by themselves. With this aspect, they know which domain they need more to work on, which is noted by Sailer and Sailer (2021). On the other hand, Legaki et al. (2021), noted that schematic categorization of information is provided by gamification to help students in remembering concepts, while gamification elements such as points and challenges provide a sense of accomplishment and growth. With this immediate feedback, students feel a sense of progress which leads to a positive increase in their motivation (Zhang, Liu & Li, 2021), teamwork and communication. Adding to the benefits, gamification is a proactive learning approach to understand complex subjects, basic arithmetic operations, foundational grammar rules, vocabulary knowledge, oral skills (Ana Vrcelj et al., 2023; Hernandez-Cherrez et al., 2021; Nikmah, 2020).

The gamified system ensures students are always motivated. Motivation is obtained by achieving points, badges, leaderboards, progress bars and avatars which students are attracted to. An intrinsic motivation is an action that is associated with an internal value, a personal enjoyment, while in extrinsic motivation, external rewards are given in exchange for continued commitment. Laura and Laura (2024), shows the significance of intrinsic motivation due to its numerous educational advantages. This aligned with Tsay et al. (2020), that noted the notable features of gamification increased and allowed students to chart their unique learning path and gamified activities boost their intrinsic motivation and active participation. An immensely increased motivation leads to students to learn effectively (Bernik et al., 2020; Torio et. al., 2020).

METHODOLOGY

This systematic review is a synthesis of evidence that has been identified and critically assessed to gain a deeper understanding of a specific topic (Rebecca Randle & Alan Finnegan, 2023). According to Julian et al. (2022), systematic review is more comprehensive than literature review, as they follow a methodical process to analyse the existing literature. This study adheres to the PRISMA guidelines, which serves as the framework for conducting the systematic review (Buadiarto Tedja et. al., 2024). The PRISMA flow diagram consists of four phases, which are Identification, Screening, Eligibility and Included (Alina Trifu et. al., 2021). Following are the steps followed according to the PRISMA guidelines.

Step I: Preparation

The PRISMA diagram is selected and examined thoroughly. It is utilized when searching appropriate articles that address the research questions.

Step II: Database search

The databases used for locating the articles are DOAJ, Ebasco, Eric, Frontiers, Proquest, SciDirect, Web of Science, Springer, ResearchGate and Scopus. All the keywords are employed individually. These keywords are then combined in various ways using Boolean operators such as “AND” and “OR”. The keywords have been identified based on the research objectives, specifically to analyse the level of teachers' readiness and identify

the challenges encountered by teachers during the implementation of gamification across various contexts and teaching environments. Limitations are also established, including publication years, article type, article access, language and requirement for full text. Only articles published between 2020 and 2025 are selected, specifically in English and Malay. They must include full-text research articles which are in open access in all the databases.

Table 1. Search strings used in all the databases to identify the articles

Search strings				
gamification	AND	teachers' readiness		
gamification	AND	teacher		
gamification	AND	teacher	AND	challenges

Step III: Additional sources

A manual search for articles is conducted through the reference lists of selected articles, including databases such as Google Scholar.

Step IV: Remove Duplicates

All duplicate articles found across different databases are eliminated to prevent redundancy in the review. The total number of articles after removing the duplicates is recorded in the flow diagram.

Step V: Screening titles/ abstracts

The next step involves screening the titles and abstracts of the remaining articles. The number of articles, as shown in the flow diagram, is recorded without counting the duplicates removed in the previous step. Articles relevant to the research questions are included, while non-compliant articles are documented in the flow diagram.

Step VI: Retrieving Reports

The number of articles eligible for full-text screening is detailed in this step. Articles excluded in step 5 are not counted in this total. Records of articles that do not have the availability of full text are listed here.

Step VII: Assessing Eligibility

The number of articles added through the retrieving reports is considered. Full-text articles are reviewed to determine their eligibility for inclusion in the systematic review.

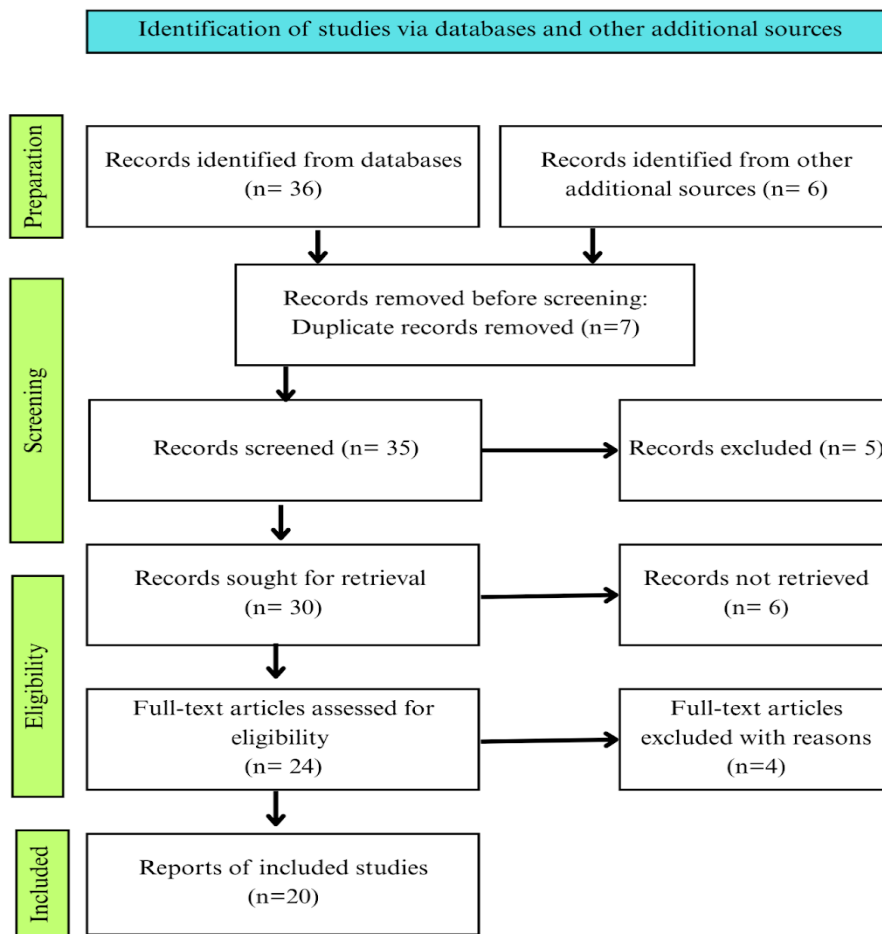
Step VIII: Exclusion criteria

After the full-text screening eligibility criteria, the number of excluded articles is recorded in the flow diagram. Articles are eliminated based on the non-compliant criteria, such as respondents and publication types (including books, book chapters, literature review, dissertation, seminar papers).

Step IX: Inclusion criteria

Recording of the total number of articles that is deemed eligible for inclusion is included in this step. In this process, 20 out of 42 articles are selected and completed the PRISMA flow diagram.

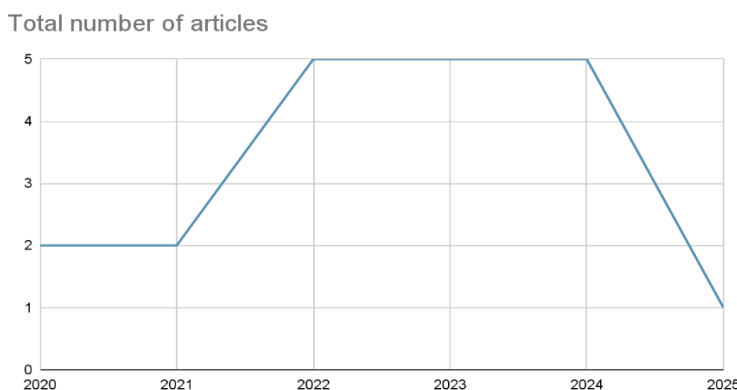
Figure 1. PRISMA Flowchart



FINDINGS AND DISCUSSION

The results of selecting study articles which receive detailed discussion are presented in this section. The established criteria served as the basis for selecting 20 research articles. The research data collection followed the developed survey protocol. Classification by publication year shows an even distribution of five articles each for 2022, 2023, and 2024. Two articles released in 2020 and 2021 precede one publication from 2025. The growth of published articles during these three years matches the findings of the Tech Trends (2024) survey which shows the start of Cyber AI's revolution in 2022. The McKinsey Technology Trends Outlook (Yee et. al., 2024) report recognizes Generative AI as a major trend in 2022 because of the substantial rise in interest and investment in this technology that enables new opportunities in various integrated fields.

Figure 2. Total number of articles based on inclusion criteria which is year 2020-2025



The respondents in the articles studied were from various parts of countries around the world. Majority were from Malaysia while others were from Algeria, Netherlands and Croatia, Ukraine, Brazil and Spain, Portugal, America, Turkey and Ukraine, Spain, Finland, Cuba, Turkey, South Africa respectively. The articles encompassed all regions across the world, including Africa, Asia, Eastern Europe, Western Europe, North America, Middle East and Latin America. This indicates gamification is utilized worldwide. This finding is aligned with the Global Gamification Market Trends that the world will go further in demand for gamification as it shows a significant growth in each region. The Africa region will have the greatest impact with a share of 60%, followed by North America at 46%, Eastern Europe at 43%, Western Europe at 40%, Latin America at 40%, Middle East at 32% and Asia at 27% (Harry Cloke, 2023).

This study examines gamification in education, specifically focusing on the level of teachers' readiness and the challenges they encounter when implementing gamification. Out of the 20 articles reviewed, 16 were conducted with the in-service teachers, 3 were conducted with trainee teachers, and 2 articles involved both groups who are integrating gamification in their lessons. The approach utilized qualitative, quantitative and mixed methods for data collection. The analysis of the approaches revealed that 8 articles employed quantitative methods, 8 articles were conducted in qualitative methods while 4 incorporated mixed methods.

Table 2. Number of methods and data collection instruments used in the articles analysed

Method	Data collection & Instruments	N
Quantitative (n=8)	Questionnaire (Likert Scale)	5
	Questionnaire (Open- ended)	1
	Questionnaire (Online)	2
Qualitative (n=8)	Structured Interview	1
	Semi-structured interview	3
	Online open-closed ended question	1
	Semi-structure online interview	1
	Questionnaire, observation, video recording, report from training course	1
	Literature review, structured interview, observation	1
Mixed methods (n=4)	Open ended questionnaire, theory	1
	Open and multiple-choice questionnaire, interview	1
	Structured questionnaire, interview	1
	Online questionnaire (Likert scale), semi-structured interview, workshop	1

Teachers express a strong preference for incorporating gamification into their instruction, recognizing that this approach fosters a conducive learning environment for their students. The integration of gamification in teaching has yielded positive outcomes, as students experience reduced pressure to grasp the subject matter and feel motivated to improve their performance (Chee Kai Yen et al., 2020). However, the findings of this study also reveal that some teachers feel inadequately equipped with the necessary media literacy or pedagogical skills to effectively source and implement appropriate gamification content in their teaching.

According to Nurul Izlin Makhtar et al. (2024), the level of teacher acceptance and interest in gamification-based approaches in this study was notably high. Teachers demonstrated enthusiasm and a strong desire to deliver

content and training through gamification applications (Borbala Bacsa-Karolyi & Fehervari Aniko, 2024). This finding indicates that teachers are open to the concept of gamification in their teaching and are willing to integrate this method into their instructional practices. Despite that, teachers' skills and knowledge regarding gamification applications play a crucial role in determining their readiness to implement these methods effectively as proved in the research of Hanifah Mahat et al. (2020). The findings of the study indicate a strong correlation among the variables of skills, knowledge, and the application of gamification. This suggests that teachers who are proficient and well-informed about gamification strategies are consistently prepared to incorporate them into their teaching practices. Furthermore, there is a positive attitude among teachers towards utilizing gamification such as Kahoot, Quizizz, Minecraft Education Edition and others in the classroom (Fathi Abdullah & Khadijah Abdul Razak, 2021). The platform's capabilities effectively engage teachers, motivate students through immediate feedback, and promote a positive and interactive learning environment.

The effectiveness of gamification methods demonstrates a positive impact on the teaching and learning process. However, Ines Arouja and Carvalho (2022) explained that challenges such as limited access to technology and restricted internet connectivity raise questions about teacher readiness to adopt gamification in their instruction. Although teachers demonstrate resilience in addressing these challenges, concerns persist regarding the potential for student disengagement, lack of enthusiasm, or discomfort with this instructional method.

They often encounter various obstacles that can affect the successful use of technology in the classroom. Marlissa Omar et al. (2023) mentioned that teachers face significant challenges regarding access to information and communication technology tools, reliable internet connections, user-friendly gamification applications, and electronic devices such as smartphones and laptops. Sonia and Matic (2023) stated that developing countries face challenges such as insufficient computer access, unstable internet connections regarding both coverage and speed, limited classroom space, inadequate technical support, restricted internet settings, and low-specification computers in educational institutions.

Teachers often face challenges when trying to master gamification tools as a teaching method, with barriers to access hindering implementation. Additionally, Muhammed Demirbilek (2022) stated that time constraints make it difficult for educators to provide new and suitable gamification materials for their lessons. These challenges contribute to a negative perception of gamification among both teachers and students. As a result, students may feel overwhelmed by the pressure to complete assignments, leading them to reject gamification as a valid learning approach (Jaaska & Aaltonen, 2022). Such negative attitudes can diminish the effectiveness of gamification, as teachers may lack confidence in employing this method in their instruction. In conclusion, teachers who are ready in all the stated aspects to manage related obstacles are important for a successful integration of gamification. This also brings a great transformation in teachers' empowerment in teaching and students' learning experiences.

Table 3. Analysis of articles included

No.	Titles And Author	Research Methods	Research Gap	Findings	RQ answered
1	<p>Exploring the Perspectives of Middle School Teachers' Towards Gamification in the EFL Context</p> <ul style="list-style-type: none"> • Ilhem Khadija Boudour (2023) • Algeria 	<ul style="list-style-type: none"> • Qualitative (Structured Interview) • Conceptual framework (TPACK) 	<ul style="list-style-type: none"> • More emphasis on learners, less focus on teachers' attempts on gamification in education. 	<ul style="list-style-type: none"> • Technical issues (limited internet) • Ineffective class management • Time constraints • Lack of suitable logistics, resources, proficiency in using ICTs • Concerns on functionality 	Key Challenges

2	<p>Teachers' readiness to Use Mobile Gamification in Teaching and Learning in Primary Schools in South Kinta District</p> <ul style="list-style-type: none"> • Tasaratha Rajan Annamalai, Maizatul Hayati Mohamad Yatim (2022) • Malaysia 	<ul style="list-style-type: none"> • Quantitative (Questionnaire) 	<ul style="list-style-type: none"> • Mobile learning is a new concept in current education. 	<ul style="list-style-type: none"> • The level of teachers' readiness based on perception, knowledge and skills are average. 	Level of Teachers' readiness
3	<p>Challenges and gender differences in implementing gamification approach among vocational college lecturers in Malaysia</p> <ul style="list-style-type: none"> • Marlissa Omar, Dayana Farzeeha Ali, Fathiyah Mohd Kamaruzaman (2023) • Malaysia 	<ul style="list-style-type: none"> • Quantitative (Questionnaire) 	<ul style="list-style-type: none"> • Less studies on adoption of gamification in vocational education sectors. • Less effort, skills, knowledge, expertise, confidence in implementing gamification in class. 	<ul style="list-style-type: none"> • Less access (lack of internet connection, limited time, resources and technical assistances) • Less proficiency in ICTs and lack of competency and awareness • Consideration of costs • Less alignment with certain subjects • There isn't any significant difference between both genders facing the challenge in adopting gamification. 	Key Challenges
4	<p>Predisposition of In-service teachers to use game- based pedagogy</p> <ul style="list-style-type: none"> • Sonia Palha and Ljerka Jukic Matic (2023) • Netherlands & Croatia 	<ul style="list-style-type: none"> • Qualitative (Online survey with open- and closed- ended questions) 	<ul style="list-style-type: none"> • Specific knowledge to teacher and require a deep understanding of teachers in gamification use 	<ul style="list-style-type: none"> • 14 hindering and 11 encouraging factors based on five factors (pedagogical, structural, personal, technical and social) 	Level of Teachers' readiness
5	<p>Role of gamification in classroom teaching: preservice teachers' view</p> <ul style="list-style-type: none"> • Rita Wong Mee Mee, Tengku Shahrom Tengku Shahdan, Md Rosli Ismail, Khatipah Abd Ghani, Lim Seong Pek, Wong Yee Von, Adelaide Woo, Yugeshineey Subba Rao (2020) • Malaysia 	<ul style="list-style-type: none"> • Quantitative (Questionnaire) 	<ul style="list-style-type: none"> • Misconceptions and questions upon use of gamification • High useful and effectiveness of gamification 	<ul style="list-style-type: none"> • Agreed to effectiveness of gamification in classroom teaching • Six categories of barriers: Resources, knowledge and skills, institutions, attitudes and beliefs, assessment, subject culture • Lack of technology and resources • Concerned about own abilities to conduct a class 	Level of Teachers' readiness
6	<p>Enhancing the digital competence of prospective primary school teachers through utilizing Kahoot!</p> <ul style="list-style-type: none"> • Inna Stakhovaa, Antonina Kushnirb, Nataliia Franchukc, 	<ul style="list-style-type: none"> • Quantitative (Testing & questionnaires) • Model "The use of interactive 	<ul style="list-style-type: none"> • Required more research on implementation of gamification and method's effectiveness 	<ul style="list-style-type: none"> • Lack of expertise and proficiency on digital literacy • Insufficient responsible attitudes • More usage on traditional teaching ways 	Level of Teachers' readiness

	<p>Kateryna Kolesnikd, Lyudmila Lyubchake, Mikhailo Vatsosf (2024)</p> <ul style="list-style-type: none"> Ukraine 	<p>technologies Kahoot! To enhance prospective primary school teachers' digital competence"</p>			
7	<p>Tinjauan rintis tahap kesediaan penggunaan gamifikasi dalam pengajaran dan pembelajaran Bahasa arab di sekolah menengah agama (A pilot survey of the level of readiness to use gamification in the teaching and learning of Arabic in religious secondary schools)</p> <ul style="list-style-type: none"> Nurul Izlin Makhtar, Ummi Syarah Ismail, Abdul Basir Awang, Nadhilah Abdul Pisal (2024) Malaysia 	<ul style="list-style-type: none"> Quantitative (Questionnaire) 	<ul style="list-style-type: none"> Required more research on usage of gamification by teachers in certain subjects such as Arabic Language 	<ul style="list-style-type: none"> The level of teachers' readiness based on acceptance of gamification is high The level of teachers' readiness based on tendency using gamification is high. 	<p>Level of Teachers' readiness</p>
8	<p>Kemahiran dan kesediaan guru pelatih Pendidikan islam terhadap penggunaan gamifikasi semasa praktikum fasa 1 (The skills and readiness of Islamic Education trainee teachers towards the use of gamification during phase 1 practicum)</p> <ul style="list-style-type: none"> Muhammad Fikri Mohd Faudzi, Amir Aminuddin Bin Mohd Pouzi, Mohd Azizi Bin Dollah. Muhammad Haziq Bin Mohd Shafie, Ahmad Fauzan Bin Mohd Rahman dan Dearana Binti Morshidi (2024) Malaysia 	<ul style="list-style-type: none"> Quantitative (Questionnaire) 	<ul style="list-style-type: none"> Teachers required training, resources, guidance and guidelines to implement gamification Hesitation to implement gamification tends brings down their confidence and disrupts the level of teachers' readiness. 	<ul style="list-style-type: none"> The level of pre- service teachers' skills is high. The level of pre- service teachers' readiness is high. High significant between the relationship of pre- service teachers' skill and level of pre- service teachers' readiness 	<p>Level of Teachers' readiness</p>
9	<p>The readiness of geography teacher trainees in gamification approach</p> <ul style="list-style-type: none"> Hanifah Mahat, Mohmadisa Hashim, Saiyidatina Balkhis Norkhaidi, Nasir Nayan, Yazid Salleh, Nur Hamid, Nur Hidayah Baharudin, Nurul Afifah Mohd Faudzi (2021) Malaysia 	<ul style="list-style-type: none"> Quantitative (Questionnaire) 	<ul style="list-style-type: none"> Lack of gamification implementation to assess teaching process during macro teaching session 	<ul style="list-style-type: none"> Level of teachers' knowledge, skill and usage on gamification is high 	<p>Level of Teachers' readiness</p>

10	<p>Brazilian and Spanish mathematics teachers' predispositions towards gamification in steam education</p> <ul style="list-style-type: none"> • Paula López, Jefferson Rodrigues-Silva and Ángel Alsina (2021) • Brazil & Spain 	<ul style="list-style-type: none"> • Mixed method (Survey & individual transcripts) 	<ul style="list-style-type: none"> • Previous studies about misinterpretation about gamification, Contradiction and disagreement about the subject. • Required a study about teachers' opinion and beliefs 	<ul style="list-style-type: none"> • Application of gamification in education is low • Confusion about concepts of gamification • Teachers agreed to benefits of gamification in students' development in education • Difficulties found in implementing gamification: Lack of resources, lack of training, low investment on gamification tools, less or no experiences handling gamification tools, 	Level of Teachers' readiness
11	<p>Enablers and difficulties in the implementation of gamification: a case study with teachers</p> <ul style="list-style-type: none"> • Inês Araújo and Ana Amélia Carvalho (2022) • Portugal 	<ul style="list-style-type: none"> • Qualitative (Case study & questionnaire) • Octalysis Framework of Gamification 	<ul style="list-style-type: none"> • Previous studies give importance to impact of gamification on achievement and progression • Several issues need further research 	<ul style="list-style-type: none"> • Technical issues: Lack of equipment, lack of computers in classroom, poor internet quality • Time constraints: Teaching technical explanations to students and planning activities based on gamification • Teachers need more knowledge and experiences in using digital tools • Negative reactions from students during technical failures 	Key Challenges
12	<p>Gamification: the experience of international baccalaureate teachers shared</p> <ul style="list-style-type: none"> • Scott Sandoval & Jodi A. Lamb (2023) • USA 	<ul style="list-style-type: none"> • Mixed method (Survey, workshop & interview) 	<ul style="list-style-type: none"> • Numerous articles on effectiveness of gamification in students' academic achievement • Misconception about gamification 	<ul style="list-style-type: none"> • Minor and major challenges • Time constraints: More time for planning and implementation, technical challenges: Equipment issues, security breach • Level of teachers' knowledge is good 	Level of Teachers' readiness
13	<p>An Examination of the Factors and Challenges to Adopting Gamification in English Foreign Language Teaching</p> <ul style="list-style-type: none"> • Muhammet Demirbilek, Tarik Talan, Khadeegha Alzouebi (2022) • Turkey & Ukraine 	<ul style="list-style-type: none"> • Qualitative method (Review, interview and observation) 	<ul style="list-style-type: none"> • Enhances students' engagement and experiences in education 	<ul style="list-style-type: none"> • Main barriers: Technological issues, classroom management, lack of motivation, students' apathy and technical difficulties 	Key Challenges

14	<p>Perception of gamification strategies in Italian secondary school</p> <ul style="list-style-type: none"> • Viviana Malvasi & David Recio Moreno (2022) • Spain 	<ul style="list-style-type: none"> • Mixed method (Questionnaire & interviews) 	<ul style="list-style-type: none"> • Poor approach of gamification as instructional tool in teaching mathematics 	<ul style="list-style-type: none"> • Lack of knowledge about gamification • Time constraints to apply gamification approach in teaching • Lack of training about gamification • Positive evaluation about gamification 	<p>Level of Teachers' readiness</p>
15	<p>Teachers' experiences of using game-based learning methods in project management higher education</p> <ul style="list-style-type: none"> • Elina Jaaska & Kirsi Aaltonen (2022) • Finland 	<ul style="list-style-type: none"> • Qualitative (Interview) 	<ul style="list-style-type: none"> • Less comprehensive research about teacher management and environment with gamification • Less research about challenges, disadvantages and barriers of gamification 	<ul style="list-style-type: none"> • Challenges for students: An increase in cognitive load and stress & frustration with teaching method • Challenges for teachers: Extra work, trouble in managing and evaluating fairly, pedagogical problems, technical problems 	<p>Key Challenges</p>
16	<p>Game- based learning and gamification in Cuban English teacher trainees</p> <ul style="list-style-type: none"> • Roberto Luis Carr (2024) • Cuba 	<ul style="list-style-type: none"> • Mixed method (Survey & interview) 	<ul style="list-style-type: none"> • Exploring new approach in teaching 	<ul style="list-style-type: none"> • Low proficiency in using technology • Positive attitude towards gamification approach • High belief in gamification enhances students' engagement in learning • High interest in experimenting new approach in teaching 	<p>Level of Teachers' readiness</p>
17	<p>The Views and Adoption Levels of Primary School Teachers on Gamification, Problems and Possible Solutions</p> <ul style="list-style-type: none"> • Huseyin Yasar, Mubin Kiyici, Abuzer Karatas (2020) • Turkey 	<ul style="list-style-type: none"> • Qualitative (Interview) 	<ul style="list-style-type: none"> • Positive effect of gamification actively used in all levels of education system 	<ul style="list-style-type: none"> • Misconception about gamification • Challenges faced: Jealousy among students, setbacks of unsuccessful students 	<p>Level of Teachers' readiness</p>

18	<p>Exploring Lecturers' Readiness and Perceptions of Gamification in Higher Education Institutions of South Africa</p> <ul style="list-style-type: none"> • T Shumba (2024) • South Africa 	<ul style="list-style-type: none"> • Qualitative (Interview) • Self-Determination Theory 	<ul style="list-style-type: none"> • Effectiveness of gamification depends on teachers' ability 	<ul style="list-style-type: none"> • Ready to continue to use gamification required more time for preparation • Positive attitude towards effectiveness of gamification in students' learning • Challenges faced: Lack of equipment, time constraints, technical and network problem, lack of funding 	<p>Level of Teachers' readiness</p>
19	<p>Knowledge Level of Gamification, Technology and Belief of Elementary School Science Education Teachers in Selangor</p> <ul style="list-style-type: none"> • Nor Alia Atierah Adnan & Siti Nur Diyana Mahmud (2023) • Malaysia 	<ul style="list-style-type: none"> • Quantitative (Questionnaire) 	<ul style="list-style-type: none"> • Positive impact on students' learning • Challenges faced during implementation 	<ul style="list-style-type: none"> • High level of knowledge on gamification • High level of knowledge on technology • High confidence level in gamification implementation 	<p>Level of Teachers' readiness</p>
20	<p>Assessing Teachers' Readiness for Integrating Gamification in ESL Instruction Using Quizizz in Teaching Vocabulary Skills</p> <ul style="list-style-type: none"> • Nur Sa'adah Nazar & Hanita Hanim Ismail (2025) • Malaysia 	<ul style="list-style-type: none"> • Qualitative (Interview) 	<ul style="list-style-type: none"> • Limited studies about teachers' perspectives about gamification 	<ul style="list-style-type: none"> • Positive attitudes towards implementation of gamification • Challenges faced: Limited access of technology and network connectivity, Lack of resources 	<p>Level of Teachers' readiness</p>

CONCLUSION

This systematic literature review examines teacher readiness in implementing gamification. It highlights the importance of teachers' skills in applying gamification practices, as these skills are crucial for developing gamification applications that align with both the subject matter and students' learning levels. Moreover, the level of teacher readiness presents challenges in adopting gamification. Issues such as unreliable internet access, insufficient resources for gamification, and technical disruptions contribute to a lack of confidence among teachers, leading some to hesitate in pursuing gamification in their teaching. Additionally, teachers often face time constraints related to the curriculum, which limits their ability to learn how gamification applications work, understand relevant gamification features, and navigate the complexities of developing their own gamification tools. These hidden challenges can diminish teachers' motivation to integrate gamification in their classrooms.

The findings of this study underscore the need for collaboration among all stakeholders, including school administrators, policymakers, and advocates of digital education, to design effective interventions aimed at enhancing teacher readiness. To facilitate a comprehensive technology-based pedagogical transformation, it is essential to provide professional development training and practical workshops that strengthen teachers' technical skills for implementing gamification in teaching. Training led by gamification experts is also crucial to support this teaching approach. Additionally, teachers need more time, flexibility, financial resources, and access to examples and materials that aid in incorporating gamification elements into their teaching practices.

RECOMMENDATIONS

Gamification in teaching and learning has a positive impact on student engagement and achievement. Numerous studies have examined the effectiveness of gamification methods in education, consistently showing that these approaches can significantly attract students' interest in their studies. Furthermore, gamification enhances students' motivation to learn. In an age where students are often distracted by smartphones and visually stimulating content, traditional teaching methods may no longer suffice in maintaining their focus (Ismail Yildiz et al., 2021; Junhang Xiao, 2022). Therefore, gamification has emerged as a relevant method for contemporary education. However, ongoing research is necessary to ensure that learning outcomes are consistently achieved through gamification techniques. This raises the important question of whether these outcomes can be sustained over the long term. Additional studies should explore whether gamification can effectively foster lasting learning results as stated by Dawadi, Shrestha and Giri 2021.

Moreover, many studies suggest that providing professional development training for teachers is essential for successful gamification-based teaching. This is largely due to a general lack of skills and knowledge among educators regarding gamification strategies. Training can significantly enhance teachers' understanding and ability to implement gamification in their classrooms as mentioned by Tengku Farahnorfadhilah and Norah (2023) with Rajeswary, Mohd Mahzan dan Norasmah (2024). Future research could also focus on the importance of professional development training for teachers in relation to gamification. This could involve employing experimental designs to assess teachers' readiness before, during, and after the training (Moufdi & Mansouri 2021). Additionally, exploring the correlation between teachers' preparedness and the effectiveness of gamification in their teaching practices would be beneficial.

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Conflict Of Interest Statement

The authors declare that there is no conflict of interest regarding the publication of this study.

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