



Influence of Gamification on Foreign Language Teaching: A Bibliometric Analysis and Systematic Review Based on Pre-service Teachers' Experiences From 2015 to 2025

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ABSTRACT: Gamification has been effective in foreign language education. Existing reviews have explored from students and in-service teachers' perceptions, while pre-service teachers' view remains underexplored. Pre-service teachers are in the process of transitioning from being learners to practitioners, which offers a novel lens for the field. The purpose of the present study was to identify the research trend, hotspots, gamified elements in instructional types, and affective dimensions concerning the influence of gamification on foreign language teaching (FLT) from pre-service teachers' viewpoints. This review adopted 99 studies for bibliometric analysis and 10 studies for systematic review between 2015 and 2025 in five databases. The results showed that there was a rapid growth in the publication. In addition, pre-service foreign language teachers expressed a positive attitude (i.e., high motivation, strong confidence, and clear intention) towards the use of gamification in both online and offline FLT. This study provides a comprehensive overview and insight for foreign language teachers, educators, and school administrators.

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1. INTRODUCTION

Gamification indicates game-design elements used in non-game contexts (Deterding et al., 2011). The use of it has been expanding in K-12 education and personalized online learning environments (Gini et al., 2025; Jia et al., 2025). Learners' experiences of mastering a new language become less stressful due to the features of gamification (Hong et al., 2025; Li & Shakibaei, 2026). The features of gamification, such as points, badges, leaderboards, immediate feedback, and team challenges, help foreign language learners enhance linguistic competence and reduce language learning anxiety by cultivating low-stress competitive environment. As a consequence, foreign language learners' learning outcomes, tolerance for ambiguity, learning adaptability, and self-management have improved (Liu et al., 2024).

In fact, teachers have shown their interests by incorporating gamification into foreign language teaching (FLT) since its advent (Reinhardt, 2018). For example, it helps teachers with clear instructional management by offering a real-time tracking of student performance through badges and process bars (Flores, 2015). Although the benefits of gamification have been witnessed for motivating language learners' engagement in the learning process (López Carrillo et al., 2019; Qiao et al., 2024), its effectiveness depends on how to apply design factors (e.g., fictional scenarios and social models), contexts (e.g., K-12 and higher education), and methodological rigor for the instruction.

2. LITERATURE REVIEW

Previous reviews on FLT using gamification from in-service teachers' perceptions have been published in recent years (Lim & Yunus, 2021; Zhang & Hasim, 2023). Lim and Yunus (2021) conducted a systematic review of 45 studies on the use of an online gamified platform (i.e., Quizizz). The results showed that teachers positively embrace the use of it in class due to its effectiveness and ability to motivate learners. However, Quizizz was the only platform adopted to evaluate teachers' perception towards gamification, which limits in comprehension to understand a variety of gamified tools and platforms. In addition, Zhang and Hasim (2023) systematically reported the benefits and drawbacks of using gamification in instruction. However, they suggested that more

databases should be adopted to understand the influence of gamification on language instruction because all included articles were retrieved from only two databases (i.e., Web of Science (WoS) and Scopus).

To date, in-service teachers' perceptions toward the use of gamification in foreign language instruction have been widely explored (Bacsa-Károlyi & Fehérvári, 2024). However, the voices of pre-service teachers who are transitioning into the profession are also needed because they will shape the use of mainstream educational technology like gamification in future classrooms through their education programmes (Bacsa-Károlyi & Fehérvári, 2025; Ottenbreit-Leftwich et al., 2010). In order to fulfill the gap of existing reviews and to understand how pre-service teachers perceive gamified FLT, it is timely and necessary to conduct a bibliometric study by adopting more databases to provide a more comprehensive review of this field including trends and research topics (Donthu et al., 2021). Furthermore, a systematic review is needed to explore pre-service teachers' perception towards gamified FLT including elements of gamification, types of FLT, and affective dimensions. The current review is guided by the following four research questions (RQ):

RQ1: How do the articles published on the impact of gamification on FLT from the perspective of pre-service teachers evolve over time?

RQ2: What are research hotspots in recent 5 years from 2021 to 2025?

RQ3: What does empirical evidence suggest about the use of gamification in FLT among pre-service teachers, regarding gamified elements and types of FLT?

RQ4: What does empirical evidence suggest about affective dimensions on using gamification in FLT from pre-service teachers' perceptions?

3. METHODOLOGY

3.1. Literature Search and Study Selection

Relevant studies published from 2015 to 2025 were retrieved from five databases including Elton B. Stephens CO (EBSCO), ProQuest, Linguistics and Language Behavior Abstracts (LLBA), Scopus, and WoS on 1st October 2025. These five databases were selected because articles published in them are generally of high quality (Gusenbauer & Haddaway, 2020). Analyzing articles in high-impact journals can help researchers identify more representative studies in their field (Shih et al., 2008). The publication period restricted to 2015-2025, because gamification has gained widespread recognition across various field after 2010 (Zichermann & Cunningham, 2011). The following search keywords for gamification, FLT, and pre-service teachers were selected: ("mobile game*" OR "game" OR "gam*" OR "gamif*" OR "gamified application" OR "gamify" OR "game elements" OR "game mechanics" OR "game application" OR "game-based design" OR "game-based teaching" OR "game-based instruction") AND ("second language teaching" OR "foreign language education" OR "foreign language teaching" OR "foreign language instruction" OR "second language instruction" OR "language education" OR "L2") AND ("pre-service teachers" OR "pre-service educator" OR "student teachers" OR "prospective teachers" OR "teacher candidate" OR "pre-professional teacher" OR "teacher trainee" OR "pre-service student teacher" OR "teacher education" OR "teacher training"). Besides, the reference lists of the articles examining the impact of gamification on FLT among pre-service teachers were manually reviewed to minimize the risk of overlooking relevant articles and to complement the electronic search for potential research.

As presented in Figure 1, a total of 3,860 articles were found in the initial search. The selection process adheres to the Preferred Reporting Items for Systematic Reviews and Meta-Analysis requirements (PRISMA) (Moher et al., 2011). A total of 99 articles were included for bibliometric analysis and 10 articles were finally included for systematic review.

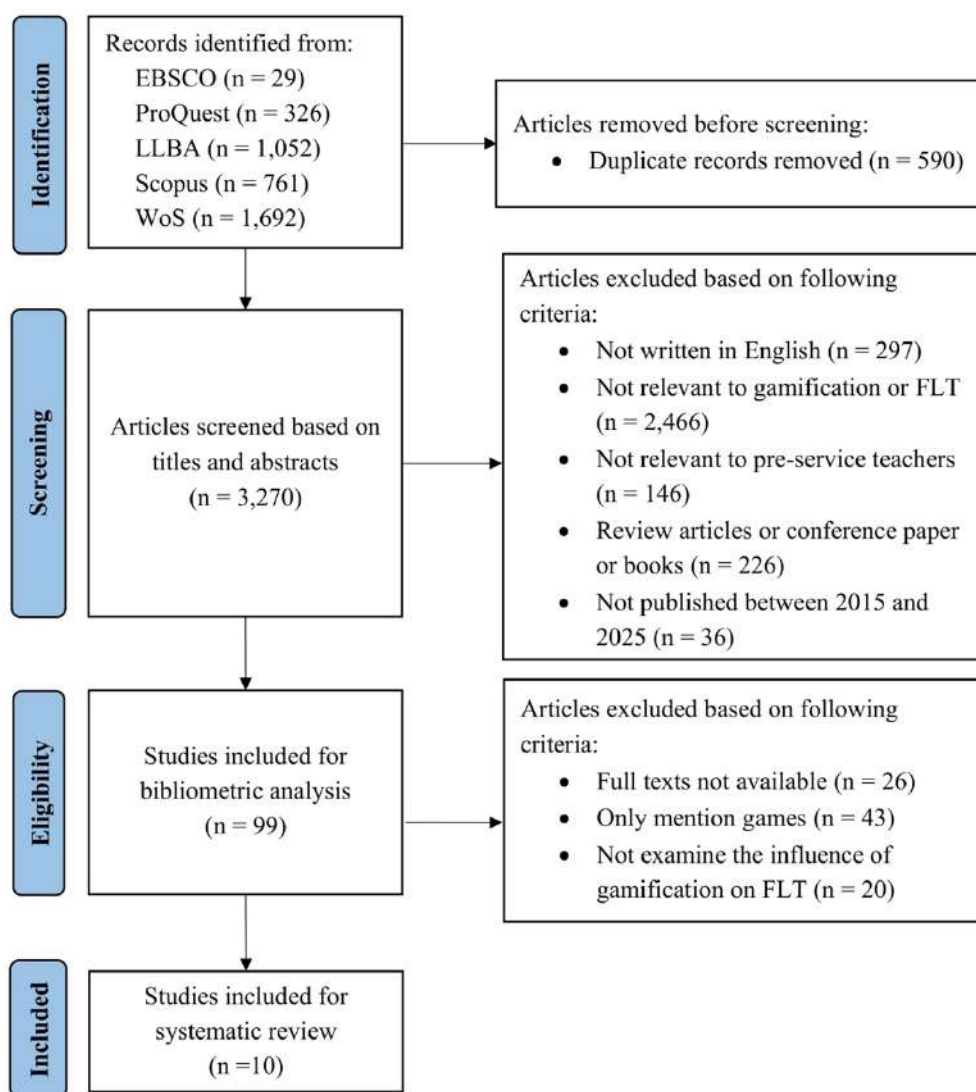


Figure 1. PRISMA flowchart.

3.2. Data Analysis

3.2.1. Bibliometric Analysis

Bibliometric analysis is a reliable and objective method for assessing scholarly research and evaluating its scientific merits through quantitative and statistical techniques (Donthu et al., 2021). Biblioshiny from RStudio (version 4.0.3) and VOSviewer software (version 1.6.19) were used to evaluate the development of articles published on the impact of gamification on FLT from the perspective of pre-service teachers, as well as hotspots based on the frequency distribution of key terms in the abstracts of these articles.

3.2.2. Systematic Review

Systematic review is a qualitative method for synthesizing evidence based on relevant existing studies (Higgins et al., 2019). Based on the remaining 99 articles from bibliometric analysis, several criteria were set to include valid articles for systematic review. The lack of access to the full-text, a focus on the application of games rather than gamification, and the failure to examine the impact of gamification on FLT among pre-service teachers were all excluded.

4. RESULTS

4.1. Bibliometric Analysis

4.1.1. Number of Articles by Years

The annual production serves as a key indicator of prevailing research trends (Donthu et al., 2021), highlighting the significance of examining the influence of gamification on FLT from the perspective of pre-service teachers. As shown in Figure 2, although the annual scientific production on the impact of gamification on FLT among pre-service teachers experienced fluctuations from 2015 to 2021, it has seen a steady increase from 2022 to 2025. The number of articles slightly decreased in 2025 because the data collection ended in October 2025. In other words, more articles are expected to be published in the remaining two months of 2025. In addition, the average annual growth rate is 35.11%. This implies that the scientific production will continue growing in upcoming years.

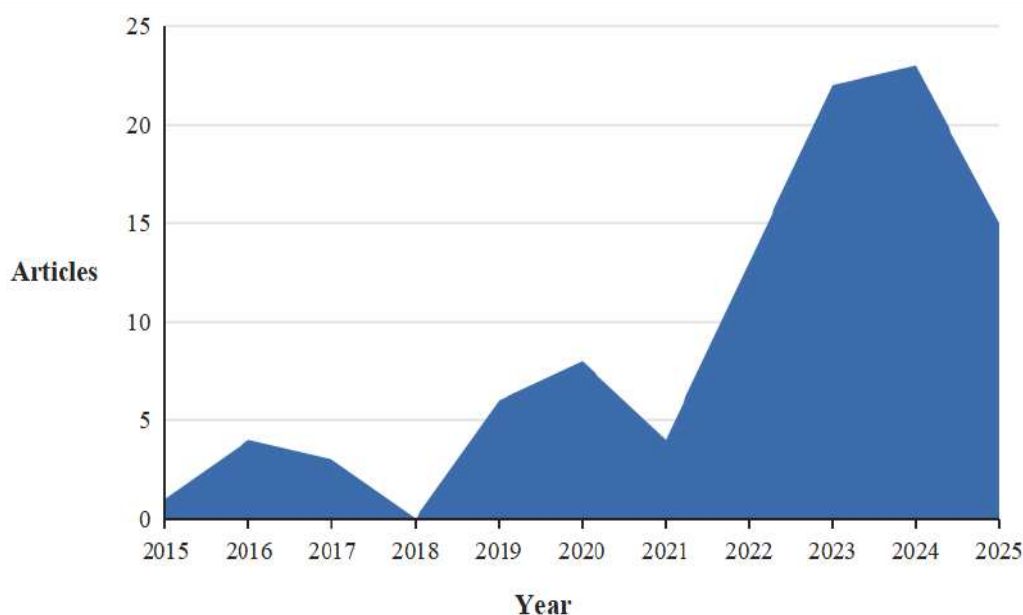


Figure 2. Annual scientific production.

4.1.2. Development of Research Hotspots in Recent Five Years

The bibliometric analysis process relies on the systematic counting of words. The impact of gamification on FLT among pre-service teachers was analyzed through a detailed examination of keywords in relevant articles. The VOSviewer program was utilized for this analysis, with “co-occurrence” selected as the analysis type, “keyword” as the analysis unit, and “full counting” as the counting method. A minimum repetition count of 6 was set for the keywords to ensure the relevance (Van Eck & Waltman, 2014), resulting in the identification of 51 keywords that met this threshold. The most frequently used top 11 keywords were pre-service teachers ($f=34$), qualitative research ($f=30$), teaching methods ($f=26$), gamification ($f=25$), learning ($f=23$), surveys and questionnaires ($f=22$), educational games ($f=22$), teaching ($f=22$), educational technology ($f=22$), teacher education ($f=21$), and higher education ($f=21$).

As presented in Figure 3, favored hotspots varied from 2021 to 2025. The research in 2021 mainly focused on understanding pre-service teachers' attitudes toward using gamification in education through qualitative research and surveys. In 2022, the scope broadened to include teacher education and educational technology. On the basis of focusing on teacher training, the published research started to focus on the integration of gamification with educational technology elements. In other words, leveraging technology with gamified elements to support teacher education became a focus. In 2023, the focus shifted to teaching methods and practical educational scenarios, examining the impact of gamified teaching methods on instruction and student engagement. In 2024, research concentrated on exploring the influence of gamification on different educational environments such as physical classrooms and online education. In 2025, hotspots shifted towards more specific areas such as language teachers and foreign language learning.

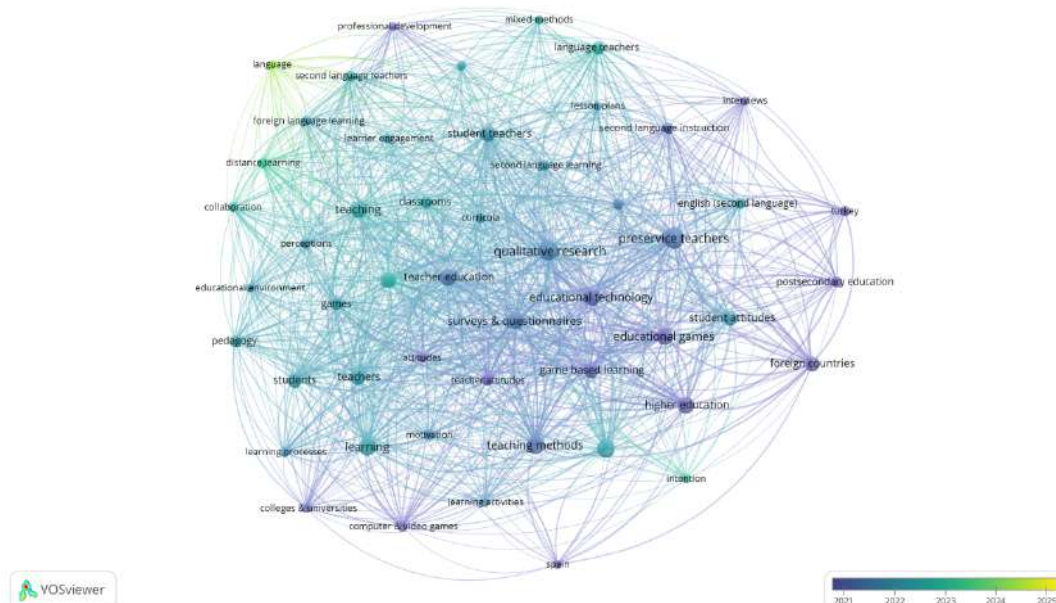


Figure 3. The most favored hotspots in articles concerning the impact of gamification on FLT among pre-service teachers in recent five years (2021-2025).

4.2. Systematic Review

4.2.1. Gamified Elements and Types of FLT

Table 1 offers several aspects of inclusive studies, including the methodology, the number of participants with their educational backgrounds, the adopted gamified elements and types of FLT.

Table 1. Overview of inclusive studies.

Methodology	Author(s) and Study	Participants and Educational Backgrounds	Gamified Elements	Types of FLT
Quantitative research	<i>Mee et al. (2020)</i> Role of gamification in classroom teaching: Pre-service teachers' view	33 bachelors	N/A	Offline course
	<i>Khalip and Li (2023)</i> TESL Trainee Teachers' perceptions toward implementing Blooket in the online English Language Teaching and Learning Process	201 bachelors (149 females, 52 males)	N/A	Online course
	<i>Wu et al. (2023)</i> The effects of a gamified online course on pre-service teachers' confidence, intention, and motivation in integrating technology into teaching	84 bachelors (58 females, 26 males)	Experience points, point system	Online course
	<i>Cespón and Toyos (2025)</i> An example of gamification for pre-service teachers in online higher education: methods, tools, and purpose	116 masters	Badges and rewards	Online course
Qualitative research	<i>Aguilar-Cruz and Medina (2021)</i> Pre-service English teachers' perceptions of their online teaching practice during pandemic times	7 bachelors	Badges and points	Online course
	<i>Masitoh et al. (2023)</i> Pre-service EFL teachers' identity construction in relation to digital gamification: A social theory of learning perspective	4 bachelors (3 females, 1 male)	Points and rewards	Offline course
Mixed-method research	<i>Başal and Kaynak (2019)</i> Perceptions of pre-service English teachers towards the use of digital badges	79 bachelors (57 females, 22 males)	Digital badges	N/A
	<i>Fernández-Portero and Castillo-Rodríguez (2022)</i> Gamification in the English Language Class: Analysis of Pre-service Teachers' Perceptions	95 bachelors (59 females, 36 males)	Linear level-up mechanism	Offline course
	<i>Güzel (2023)</i> Gamified lesson plan development with ELT pre – service teachers: A gamified google classroom experience	36 bachelors (28 females, 8 males)	Badges, awards, and leaderboard	Online course
	<i>Matviienko et al. (2023)</i> Gamified English Language Learning in Ukraine: Critical Divide between Tradition and Innovation	43 bachelors	Points, badges, team and individual competition, scoring/grading, and leaderboard	N/A

Based on the systematic analysis of 10 inclusive studies, quantitative and mixed-method research were the main adopted methodologies to explore the influence of gamification on FLT from pre-service teachers. All four quantitative studies utilized Likert-scale questionnaires to explore pre-service teachers' perceptions. Three studies (Khalip & Li, 2023; Mee et al., 2020; Wu et al., 2023) employed a five-point Likert scale to measure constructs such as pre-service teachers' perceptions, confidence, and motivation, while only one study (Cespón & Toyos, 2025) opted for a seven-point Likert scale. This study intended to capture more nuanced differences in participants' responses. The focus on standardized questionnaires ensured the objectivity and comparability of quantitative data across these studies. Another four mixed-method research integrated both quantitative and qualitative approaches to comprehend pre-service teachers' perceptions. Başal and Kaynak (2019) and Güzel (2023) adopted five-point Likert-scale questionnaires with open-ended questions and semi-structured questions respectively. Fernández-Portero and Castillo-Rodríguez (2022) used a combination of surveys, practical tasks, and four-point Likert-scale questionnaires. Matviienko et al. (2023) collected data through written responses and a survey. This hybrid approach allowed the studies to validate quantitative findings with the support from qualitative evidence. The remaining two qualitative research emphasized an in-depth understanding to explore pre-service teachers' personal experiences and perceptions. Aguilar-Cruz and Medina (2021) adopted narrative interviews to gather detailed pre-service teachers' views on gamification in online teaching, such as perceived challenges and value. Masitoh et al. (2023) combined written history documents with semi-structured interviews, enabling a comprehensive understanding of how pre-service teachers constructed professional identities through gamification practice, as well as identifying struggles they encountered.

A total of 698 participants studying at higher education were included. 83% pre-service teachers in the inclusive research were pursuing undergraduate degrees, with the exception of only one study targeting at those enrolled in masters' degree. The most frequently used gamified elements were badge, followed by points, awards, and scores. Among 10 inclusive studies, five of them concentrated on online foreign language course, and three of them focused on offline course. The remaining two studies did not specify.

4.2.2. Affective Dimensions on Using Gamification in FLT

As presented in Table 2, a majority of pre-service teachers agreed with the effectiveness of gamification in FLT based on their affective dimensions including influential motivation, confidence in using gamification, and intention to adopt gamification in the future instruction.

Table 2. Affective dimensions from pre-service teachers' perceptions on gamified FLT.

Study	Affective dimensions		
	Gamification-driven motivation	Confidence in using gamification	Intention to adopt gamification
Başal and Kaynak (2019)	• Competition (friendly rivalry) • A sense of achievement	N/A	• 79.48% expressed they would use badges in their future English language classes for greater level in students' motivation, self-confidence, and engagement. • 11.39% hesitated to use badges when considering students without any of them since this might result in unmotivating feelings and discouragements. • 10.12% expressed their unwillingness to use badges due to students' ideas, language proficiency, and the class size.
Mee et al. (2020)	• Students' subconscious learning • Reduced anxiety	• 60.6% expressed they could use gamification they prepared effectively in their teaching life. • 30.3% kept neutral. • 9.1% totally disbelieved that they could use it well in teaching without enough knowledge or media literacy.	• More than 50% pre-service teachers intended to integrate gamification while teaching because of the suitable environment it provided for learners to learn.

Table 2. *Continued.*

Study	Affective dimensions		
	Gamification-driven motivation	Confidence in using gamification	Intention to adopt gamification
Aguilar-Cruz and Medina (2021)	- Students' interest in badges - Gamified tasks	N/A	N/A
Fernández-Portero and Castillo-Rodríguez (2022)	Features of gamification to - motivate students. - spark students' interest in the subject. - foster students' curiosity and willingness to learn. - nurture students' creativity.	N/A	95.8% would use this method in the future because this gamified approach is an "ideal way of learning", which can effectively reinforce grammatical knowledge, stimulate student motivation and curiosity, and also foster collaboration and problem-solving skills.
Güzel (2023)	- Feedback and progress tracking. - A sense of community.	- Gained the ability to define gamification and its mechanisms ($M = 4.53$). - Useful for the teaching profession ($M = 4.53$). - Prepared to apply learning ability in life ($M = 4.50$).	66.7% indicated they would surely use gamification in the future in that it can improve their future professional lives as gamified content enhances student motivation and engagement. It serves as an excellent EFL classroom tool. 30.6% remained doubtful in using it due to practical difficulty, lack of technical support, or insufficient resources. 2.7% responded negatively with own technology competence and responsibility issues.
Khalip and Li (2023)	- Making students feel motivated to learn English online. - Helping students pay full attention. - Reducing students' anxiety about English. - Being time-saving for teachers.	A majority of pre-service teachers showed they are confident in using gamification ($M = 4.55$) by easily - preparing assessment materials with gamification and accessing gamification - understanding gamified system.	N/A
Masitoh et al. (2023)	- Students' positive responses (increased enthusiasm, curiosity and motivation towards English). - Own sense of accomplishment.	Three of four pre-service teachers showed confidence with result of - promoting beneficial interaction with students. - driving positive progress in students' scores. - facilitating peer interaction in micro-teaching classes. - the ease of using gamification.	All four pre-service teachers intended to apply gamification in their future practice by - acknowledging the significance of digital gamification - receiving students' positive responses at schools. - believing this approach effectively addresses student boredom in today's classrooms.

Table 2. *Continued.*

Study	Affective dimensions		
	Gamification-driven motivation	Confidence in using gamification	Intention to adopt gamification
Matviienko et al. (2023)	• Student engagement. • Own sense of progress.	Confidence in using Moodle for gamified activities due to • proficiency in mastering tools. • effective practice. • positive feedback.	90.4-100% pre-service teachers with positive intention on using gamification for FLT to • enhance students' vocabulary learning, speaking, reading, and writing abilities. • cultivate students' creative and logical thinking.
Wu et al. (2023)	• Willingness to explore more emerging technologies ($M = 4.57$).	Confidence significantly increased by • the well course design. • accumulating experience and enhancing capabilities through effective practice ($M = 4.58$).	Strong intention to adopt gamification influenced by the course design because of the positive experience of gamified course and its suitability ($M = 4.49$).
Cespón and Toyos (2025)	• Attaining personalized challenges, badge rewards, accomplishment, playfulness and practical value of gamification.	N/A	The majority reported increased intention for future instruction with gamification to • enhance student engagement in class. • contribute to a deeper understanding.

Pre-service teachers' high motivation was mainly influenced by dual-dimensional benefits for themselves and students. They adopted gamified elements for own professional development, such as exploring emerging technologies (Wu et al., 2023), achieving own sense of progress (Matviienko et al., 2023), attaining personalized challenges and badge rewards (Cespón et al., 2025), receiving feedback (Güzel, 2023), and experiencing a sense of achievement through friendly competitions (Başal et al., 2019). In addition, pre-service teachers were reported to be motivated by positive student feedback, including interest in badges or gamified tasks (Aguilar-Cruz et al., 2021), increased learning motivation (Masitoh et al., 2023; Mee et al., 2020), and enhanced classroom engagement (Matviienko et al., 2023). It is worth noting that, while still positive, some pre-service teachers reported slightly lower satisfaction with the social experience of the gamification experience, which might impact their motivation (Cespón & Toyos, 2025). This dissatisfaction came from certain gamification elements lacking leaderboards, leading students to complete challenges individually and reducing their sense of participation in a shared social experience.

Moreover, pre-service teachers indicated that their confidence was significantly strengthened when they used gamification in teaching foreign languages. Khalip and Li (2023) found that a majority of pre-service teachers demonstrated confidence in using gamification, as evidenced by their ability, easy preparation for gamified assessment materials, easy access to gamification tools during online English classes, and better command on using gamification systems. Wu et al. (2023) indicated that gamified course design significantly increased pre-service teachers' confidence because they accumulated related experience and enhanced capabilities through practical training. Güzel (2023) showed that pre-service teachers have higher confidence in defining gamification and evaluating gamified content. They further believed that gamified FLT paves the way for their teaching profession. In the qualitative studies by Aguilar-Cruz and Medina (2021) and by Masitoh et al. (2023), pre-service teachers reflected that they gradually cultivated confidence by addressing practical issues related to gamification techniques and resource limitations.

Finally, pre-service teachers embraced the intended use of gamification in FLT because it helps with students' learning outcomes, such as language skills (Matviienko et al., 2023), problem-solving ability (Fernández-Portero & Castillo-Rodríguez, 2022), collaborative skills (Fernández-Portero & Castillo-Rodríguez, 2022), and creative as well as logical thinking (Wu et al., 2023). In addition, pre-service teachers reported a high intention to use gamification in the future to make their instruction keep on being effective (Güzel, 2023).

5. DISCUSSION

The aim of the current review was to explore the development, hotspots, gamified elements, types of FLT, and affective dimensions from pre-service teachers' viewpoints. Results indicated that the research field experienced a rapid development with a focus on

language teachers and foreign language learning recently. In addition, the existing literature shows that pre-service teachers embrace gamification elements for both online and offline FLT.

5.1. Bibliometric Analysis

5.1.1. Number of Publications

The current review found that the total number of publications on the influence of gamification for FLT among pre-service teachers was 99 in the recent decade (2015-2025). This explains why Matvienko et al. (2023) claimed that the use of gamification remains a breakthrough for instruction. Although the total number of publications was limited, the average annual growth rate reached 35.11%. This represents that this research area has experienced rapidly growing (Kumar et al., 2025). In other words, pre-service teachers' voices are highly considered because they are the potential stakeholders to adopt the latest educational platforms and tools to boost their student performance (Başal & Kaynak, 2019; Ottenbreit-Leftwich et al., 2010). In addition, the role that gamification takes in education has been valued. As evidenced by Gini et al. (2025), the review showed a significant increase in gamification production from 2011 to 2024, with a particular emphasis on its role in education and learning.

5.1.2. Research Hotspots in Recent Five Years

The findings for the research hotspots in recent five years (2021-2025) are in line with the existing literature (Aguilar-Cruz & Medina, 2021), which highlights the importance of gamification in FLT shaped by pre-service teachers' perspectives. In 2021, the research hotspots were related to pre-service teachers' attitudes toward using gamification, which is consistent with the claims of Aguilar-Cruz & Medina (2021). In 2022, teacher training became the focus to ensure the appropriate use of gamification in FLT. This finding is in line with the study of Güzel (2023), who pointed the need to offer training for pre-service teachers to make them feel confident in arranging courses with gamification. In 2023, educational contexts and student engagement were the research hotspots. Student engagement is influenced by the instructional environment, which is potentially related to how FLT is arranged with gamification (Khalip & Li, 2023). In 2024, the focus has been extended to online instruction. This finding reflected that the benefit of gamification has been valued (Lim & Yunus, 2021). In 2025, language-related areas (i.e., language teachers and foreign language) have been strengthened, which implied the importance of conducting a review to understand the use of gamification in FLT from pre-service teachers' perspectives.

5.2. Systematic Review

5.2.1. The Preferred Gamified Elements and Types of FLT

The results found that the most preferred gamified elements are badges, followed by points, awards, and scores based on 10 inclusive studies in the current systematic review. There is no doubt that badges have been one of the most popular gamified features for instruction. The current finding is supported by Anderson et al. (2013) revealing that badges act as a tool to motivate language learners. Their learning behaviour will be positively influenced, followed by getting more engaged in classes (Hakulinen & Auvinen, 2014).

In addition, gamification has been summarized to be often used in online FLT compared to offline instruction based on the inclusive studies from 2019 to 2025. One of potential reasons to explain is that gamification had to be adopted for online instruction to guarantee the normal education during the COVID-19 pandemic period from 2019 to 2023 (Hodges et al., 2020). This also explains the focus of gamification on FLT tends to be online courses rather than offline ones during the particular period. In addition, Bao (2020) added that students are easy to get distracted in online courses. Teachers need to spend more efforts to attract and activate learners by using gamified elements.

5.2.2 Affective Dimensions

The review showed that pre-service foreign language teachers' perceptions with gamification are equipped with high motivation, strong confidence, and clear intention. First, pre-service teachers generally demonstrated high motivation when gamification was applied in teaching language-related courses, whether it was for their own benefit or that of their students. This result aligns with the findings of López Carrillo et al. (2019) reporting that pre-service teachers believe that motivation is the most important element in gamified FLT. On the contrary, pre-service teachers worried gamification might cause classroom chaos (e.g., student distraction or disciplinary issues), which could potentially undermine the motivation to adopt this approach (Sajinčič et al., 2022).

Second, most pre-service teachers showed high confidence in using gamification by receiving students' positive feedback, observing their improved language performance, and making progress in language proficiency, which was also evidenced by Aguilar-Cruz and Medina (2021). While many pre-service teachers reported feeling more confident in using gamification, those with less technical knowledge or media literacy found it difficult to implement (Bálint-Svella, 2021). They viewed it as too time-consuming to prepare for a foreign language class within a fixed curriculum and limited instructional time.

Third, a majority of pre-service teachers had clear intention to adopt gamification in future practice in that this innovative approach plays a role in students' learning outcomes. It is in accordance with previous studies demonstrating the positive acceptance by foreign language teachers (Lim & Yunus, 2021; Zhang & Hasim, 2023). Although barriers such as insufficient materials and technology support exist (Güzel, 2023; Mee et.al, 2020), the benefits of gamification in FLT appear to outweigh these challenges. Consequently, pre-service teachers are showing a growing inclination towards its adoption.

6. LIMITATIONS AND FUTURE DIRECTIONS

There are two limitations in this review. On one hand, this study excludes non-English publications which may result in an epistemological bias in understanding global research trends in gamification on FLT from pre-service teachers' perspectives. This limitation further affects the applicability of the findings to diverse global contexts. Therefore, future studies should incorporate non-English journals and call for collaborations with multilingual research teams to broaden the linguistic and cultural inclusivity of bibliometric analyses in this field.

On the other hand, the current review did not use meta-analysis to offer a more objective finding compared with systematic review due to the insufficient number of existing quantitative studies (Higgins et al., 2019). Therefore, more quantitative articles are expected to be conducted in the future to examine whether there is any discrepancy on the summarized finding between two different research methodologies.

7. IMPLICATIONS AND CONCLUSION

The current review offers practical implications for foreign language teachers, educators, and school administrators. For foreign language teachers, they could refer to affective dimensions among pre-service teachers to learn from their first-hand experiences when they plan to integrate gamification in their own FLT. For educators, the rapid annual growth rate suggests them to realize the importance of gamification on FLT. They can offer detailed guidance on helping teachers make the most use of gamification in instructions step by step. For school administrators, they are supposed to encourage the implementation of gamification in FLT and offer training workshops by inviting professionals in gamified areas to raise teachers' awareness of embracing the latest gamified features in FLT.

In conclusion, this study combines a bibliometric analysis and systematic review to examine the influence of gamification on FLT from the perspective of pre-service teachers. The study found that this research area has attracted scholars' attention based on the rapid growth of publications through bibliometric analysis. Research hotspots over the last five years have focused on pre-service language teachers' attitude, training, class engagement, online instruction, and foreign language. In addition, the results of the systematic review revealed that badges have been the most frequently used gamified element in class, especially for online FLT among pre-service teachers. They held high motivation, strong confidence, and clear intention to adopt gamification in future FLT.

Conflict of interest disclosure

The authors declare no conflict of interest.

Data availability statement

The datasets used in the current study are available from the corresponding author on reasonable request.

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