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BIBLIOMETRIC MAPPING OF GAMIFICATION RESEARCH IN LANGUAGE LEARNING: ANALYSIS OF PUBLICATION PATTERNS, RESEARCH THEMES, AND RESEARCH GAPS (2020-2026)

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Abstract: *This study aims to map the research landscape of gamification in language learning from 2020 to 2026. Although the use of gamification in education is increasing due to its potential to boost student motivation and engagement, research on language learning remains unevenly developed and fragmented, making it difficult to gain a comprehensive understanding of publication patterns, intellectual structures, and existing research gaps. Therefore, this study was conducted to analyze publication patterns, identify key contributors, and map themes and collaboration structures in this field. A total of 1,319 documents were retrieved from the Scopus database and analysed using a bibliometric approach that integrates performance analysis and science mapping through network visualization software. The study results showed a consistent increase in publications, peaking before a decline in the last year. The theme of education dominated the research landscape, accounting for more than half of the total documents, followed by technology, while other domains showed more limited involvement. Keyword network analysis showed a close relationship between the concepts of motivation, education, and game-based learning, while the collaboration structure showed active international networks involving Asian and European countries. Overall, these findings indicate that the field of gamification in language learning is moving towards maturity, but still requires a broader thematic focus and a more balanced domain approach to shape a more strategic and high-impact future research agenda.*

Keywords: *Gamification; Language Learning; Bibliometric Analysis; Science Mapping; Research Trends; Intellectual Structure; International Collaboration*

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Introduction

The development of digital technology in 21st century education has significantly changed the landscape of teaching and learning. The integration of technology is no longer supportive, but rather a key component of modern pedagogical design. In this context, gamification has emerged as an increasingly significant approach due to its ability to combine game elements with formal learning objectives (Zainuddin, Chu, Shujahat, & Perera, 2020).

In language learning, gamification is often associated with increased motivation, student engagement, and academic achievement. However, previous research findings show that the effectiveness of gamification depends on the design of the intervention and the context of its implementation (Sailer & Homner, 2020). Most studies focus on specific skills such as vocabulary, grammar, or mobile-assisted language learning (Zou, Huang, & Xie, 2019). This specific focus has caused the development of the field to become fragmented and lacks a comprehensive picture of its intellectual structure.

Although there are systematic reviews and meta-analyses that assess the impact of gamification in education, these studies focus more on the impact of interventions than on publication patterns, collaboration networks, and the evolution of research themes in this field (Donthu, Kumar, Mukherjee, Pandey, & Lim, 2021). Therefore, there is still a need to comprehensively map the development of gamification research in language learning using a bibliometric approach.

Accordingly, this study aims to analyze the development of gamification research in language learning for the period 2020 to 2026 through bibliometric analysis. This study examines annual publication trends, influential authors and institutions, dominant theme clusters, and international collaboration patterns. It is hoped that the findings of this study will provide a comprehensive picture of the direction of development of the field and identify research gaps to be explored in the future.

Based on the background and research gaps identified, this study answers the following questions:

1. What are the trends in the development of gamification research publications in language learning for the period 2020 to 2026?
2. Who are the most influential authors, institutions and countries in the field of gamification of language learning based on the number of publications and citations?
3. What are the dominant research themes and keyword clusters that form the intellectual structure of this field?
4. What are the patterns of research collaboration between authors and between countries in the field of gamification of language learning?
5. What research gaps still exist and have the potential to be explored in the future?

Literature Review

Growth of Gamification Research in Language Learning

Recent studies have shown that research on gamification in language learning has grown consistently over the past decade, particularly in the context of digital technology-based learning. Previous meta-analyses have reported that the use of game elements in learning has positive effects on cognitive and affective dimensions, although the effectiveness of the intervention is influenced by the pedagogical design and implementation context (Sailer &

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Homner, 2020; Zainuddin et al., 2020). In the language context, the use of mobile applications and interactive platforms has shown an increasing interest among researchers in the potential of gamification as a medium to support student engagement and consistency in learning (Ajisoko, 2020; Shortt, Tilak, Kuznetcova, Martens, & Akinkuolie, 2023).

This increase not only indicates an increase in empirical studies, but also reflects a shift in research focus from simply testing the effectiveness of interventions to understanding how game elements are integrated into language learning designs. This development indicates that gamification has emerged as an increasingly stable subfield in the language education research landscape.

Effectiveness and Design Considerations in Gamified Learning

Previous studies have consistently reported that gamification has the potential to increase student motivation and engagement. However, the literature also emphasizes that the true effectiveness lies not in the use of game elements alone, but in how those elements are meaningfully integrated with language learning objectives. Designs that only emphasize points, badges, or rewards without a clear pedagogical alignment risk producing short-term motivational effects without lasting learning impacts (Govender & Arnedo-Moreno, 2021; Sailer & Homner, 2020).

In addition, variations in intervention duration, task difficulty level, and implementation context also contribute to inconsistent findings across systematic studies (Zainuddin et al., 2020; Zhang & Hasim, 2023). These differences indicate that gamification is not a one-size-fits-all approach, but rather requires careful and contextual pedagogical design. Therefore, discussions about the effectiveness of gamification need to move beyond the question of "whether it works" to the question of "how and under what conditions it works optimally".

Vocabulary-Centered Research Trends

Literature analysis shows that the majority of gamification studies in language learning focus on vocabulary acquisition. Interventions typically use game-based applications and pre-test and post-test designs to assess effectiveness on retention and mastery of new words (Costuchen & Vayá, 2022; Patra, Shanmugam, Ismail, & Mandal, 2022; Yu, 2023). This focus is understandable because vocabulary is easier to measure quantitatively and is consistent with game mechanics such as points, achievement levels, and repeated rewards (Zou, Huang, & Xie, 2021).

However, an excessive focus on vocabulary has the potential to limit the scope of the field's development. The dominance of vocabulary-based studies may create a perception that gamification is more suitable for basic, mechanical skills, rather than more complex, communicative language skills. This situation reflects the research tendency to select domains that are easy to measure, rather than exploring dimensions of language learning that require more in-depth and structured intervention designs.

Underexplored Complex Language Skills

Compared to studies focusing on vocabulary acquisition, more complex language skills such as writing, speaking, advanced grammar, and authentic interaction have been underexplored in gamification research. Although there are some studies that examine these aspects, their number is still limited and most require more in-depth and contextual intervention designs (Zhang & Hasim, 2023; Zou et al., 2021).

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Complex language skills typically involve higher cognitive processes, critical thinking, and dynamic social interactions. Therefore, the application of gamification in this domain cannot rely on basic mechanics such as points or reward systems alone, but requires narrative elements, collaborative missions, and meaningful formative feedback. The lack of research in this area suggests that the full potential of gamification in supporting the development of comprehensive language competence has not yet been fully exploited. This imbalance creates significant space for further research that is more diverse and integrative.

Methodological Issues and the Need for Bibliometric Mapping

From a methodological perspective, the current literature also presents several issues that have implications for the consistency of findings in gamification studies in language learning. These include inconsistent reporting of gamification elements, differences in instruments for measuring student motivation and engagement, and a lack of longitudinal studies that can distinguish the true effects of interventions from the effects of novelty (Sailer & Homner, 2020; Zainuddin et al., 2020). Inconsistencies in study designs and implementation contexts make direct comparisons between studies difficult and limit the generalizability of findings.

Although systematic reviews and meta-analyses have contributed to understanding the effectiveness of gamification interventions (Zhang & Hasim, 2023), these approaches typically focus on learning outcomes and do not provide a comprehensive picture of the intellectual structure and development patterns of the field. Aspects such as researcher collaboration networks, citation influence, the evolution of dominant themes, and publication growth trajectories are still poorly mapped. Methodological guidelines for conducting bibliometric analyses have been detailed in the literature (Donthu, Kumar, Mukherjee, Pandey, & Lim, 2021), but their application in the context of gamification of language learning is still limited.

Therefore, bibliometric mapping is needed to understand publication patterns, thematic structures and collaboration networks at the macro level. This approach allows for a more systematic assessment of the maturity of the field and identification of research gaps, thus providing a solid basis for planning future research agendas.

Methodology

This study adopts a bibliometric analysis approach to systematically investigate the development of research on gamification in language learning using quantitative data. Bibliometric analysis enables structured mapping of publication growth, collaboration networks, and thematic configurations within a specific research domain (Zainuddin, Chu, Shujahat, & Perera, 2020; Zhang & Hasim, 2023). In comparison with conventional narrative reviews, bibliometric techniques offer a more objective and data-oriented representation of a field's intellectual structure, particularly when analysing large-scale datasets (Donthu, Kumar, Mukherjee, Pandey, & Lim, 2021).

The data for this research were retrieved from the Scopus database to ensure extensive, high-quality, and reliable coverage of scholarly publications. Scopus was selected due to its comprehensive indexing of peer-reviewed journals that comply with established academic publishing standards. The reliance on indexed databases is essential in bibliometric studies, as such sources typically meet recognised quality benchmarks (Govender & Arnedo-Moreno, 2021). Therefore, only documents classified as journal articles under Scopus criteria (DOCTYPE: ar) were included to maintain dataset consistency and quality. It is acknowledged that certain publication series resembling conference proceedings (e.g., Lecture Notes in

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Computer Science) may be indexed as "articles" in Scopus; however, these records were retained in accordance with the predefined search parameters (Donthu et al., 2021).

To ensure transparency and reproducibility in the document selection procedure, the search and screening stages were carried out systematically in accordance with established reporting guidelines and bibliometric methodologies (Donthu et al., 2021; Page et al., 2021). The search scope was defined based on publication year, document type, language, and core keywords related to gamification and language learning. Records obtained from the initial search were screened to remove duplicates and to exclude documents that did not satisfy the inclusion criteria. Subsequently, the exported bibliographic data underwent cleaning and standardisation before the analysis phase commenced.

The analytical procedure comprised two principal components, namely performance analysis and science mapping, to evaluate publication productivity, citation influence, collaboration structures, and thematic clusters that collectively shape the intellectual architecture of this research field (Donthu et al., 2021; van Eck & Waltman, 2010).

Data Search Strategy

The literature search process was conducted using the Scopus database, which was selected based on its extensive coverage of indexed international journals and its suitability for large-scale bibliometric analysis. The selection of Scopus also took into account the reliability of publication data and the consistency of metadata required to produce accurate quantitative analysis. This approach is in line with bibliometric research practices that emphasize source accuracy and database stability (Sailer & Homner, 2020; Zainuddin, Chu, Shujahat, & Perera, 2020).

The search was conducted using the TITLE-ABS-KEY function to ensure that the primary keyword appeared in the title, abstract, or document keywords. The search strings used were as follows:

TITLE-ABS-KEY ("gamification" AND "language learning")
AND PUBYEAR > 2019 AND PUBYEAR < 2027
AND (LIMIT-TO (DOCTYPE, "ar"))
AND (LIMIT-TO (LANGUAGE, "English"))

The search was limited to journal articles ("ar") published between 2020 and 2026 in English to ensure uniformity and comparability of data. Language restrictions were implemented to avoid variations in term interpretation and to ensure consistency in bibliographic analysis.

To ensure more comprehensive disciplinary coverage, the search was not limited to a single subject area. Instead, it included various categories in Scopus such as computer science, social sciences, education, psychology, as well as interdisciplinary fields related to technology and language learning. This strategy is in line with bibliometric analysis procedures that recommend broad database coverage to map research areas that are cross-disciplinary in nature (Donthu, Kumar, Mukherjee, Pandey, & Lim, 2021).

The initial search yielded 1,319 records. All of the records were exported in bibliographic format for subsequent cleaning and analysis. The filtering process involved reviewing titles and abstracts to ensure relevance to the study focus and eliminating records that did not meet the

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specified inclusion criteria. After the data filtering and standardization process was carried out, all 1,319 articles were retained for bibliometric analysis. Title and abstract review confirmed that all records met the specified criteria and no documents were dropped at the final stage. This finding indicates that the Scopus search parameters used were specific enough to identify publications related to gamification in language learning.

Data Analysis

Bibliographic data including publication year, article title, author name, journal source, citation count and keywords were extracted from the Scopus database in Plain Text format. This data set covers publications for the period 2020 to 2026. The subsequent analysis was conducted using BiblioPro Version 1 software to perform performance analysis and bibliometric mapping. This approach allows for a systematic assessment of publication productivity and structural relationships between bibliometric elements in a research field (Donthu, Kumar, Mukherjee, Pandey, & Lim, 2021).

In this study, BiblioPro Version 1: Advanced Bibliometric Analysis System developed by Dr. Ramlan Mustapha was used as the main analysis software. The exported data set in CSV format was imported into BiblioPro to enable bibliometric mapping and quantitative analysis to be carried out in a structured and systematic manner.

BiblioPro was used for two main analysis components, namely: (i) performance analysis, which assesses annual publication trends as well as productivity and citation impact of authors, journals, institutions and countries; and (ii) science mapping, which produces a visualization of research theme networks and clusters. This procedure is consistent with the bibliometric analysis framework that emphasizes the use of quantitative performance indicators and mapping the structure of intellectual relationships in a field of study (Donthu et al., 2021).

Before network analysis is conducted, bibliographic data undergoes a pre-processing process to improve mapping accuracy. This process involves standardizing author names (e.g., resolving abbreviation variations or spelling differences), aligning institutional affiliations, and merging keywords with similar meanings to ensure consistency in co-frequency analysis. Data pre-processing is an important step in bibliometric research because it avoids node fragmentation and increases the reliability of the resulting network structure (Donthu et al., 2021).

In keyword co-frequency analysis, only keywords that reach a specified minimum occurrence threshold are included in the mapping to reduce data congestion and increase network stability. Theme frequency represents the cumulative number of keyword occurrences and can exceed the actual number of documents because an article may contain more than one related keyword. The software then forms theme clusters based on the strength of the co-frequency relationships between keywords.

In addition, co-authorship analysis was also conducted at the author and country levels to identify collaboration patterns and dominant nodes in research networks. This approach is consistent with the principles of bibliometric network mapping which emphasizes the strength of relationships and structural positions in interpreting the intellectual and collaborative structure of a field (Donthu et al., 2021; van Eck & Waltman, 2010).

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Results

Trend in Gamification in Language (2020-2026)

The figure shows a consistent upward trajectory in the number of publications related to gamification in language learning for the period 2020 to 2025 before recording a significant decline in 2026. Starting with 126 publications in 2020, the number increased slightly to 130 in 2021 and then to 167 in 2022. The growth rate became more pronounced in 2023 with 210 publications, followed by a significant jump to 314 publications in 2024 and reaching a peak of 333 publications in 2025, thus reflecting a continued expansion phase and increasing academic attention to the field. The decline to 39 publications in 2026 should be interpreted with caution as the data obtained only covers records up to February 2026; therefore, the decline is most likely due to incomplete data for the current year and does not indicate a true decline in research interest. Overall, this trajectory shows steady growth and consistent productivity increases until reaching a level of research structural maturity, in line with the rapid development of the digital learning ecosystem and the increasing acceptance of gamification-based pedagogical approaches in language education.

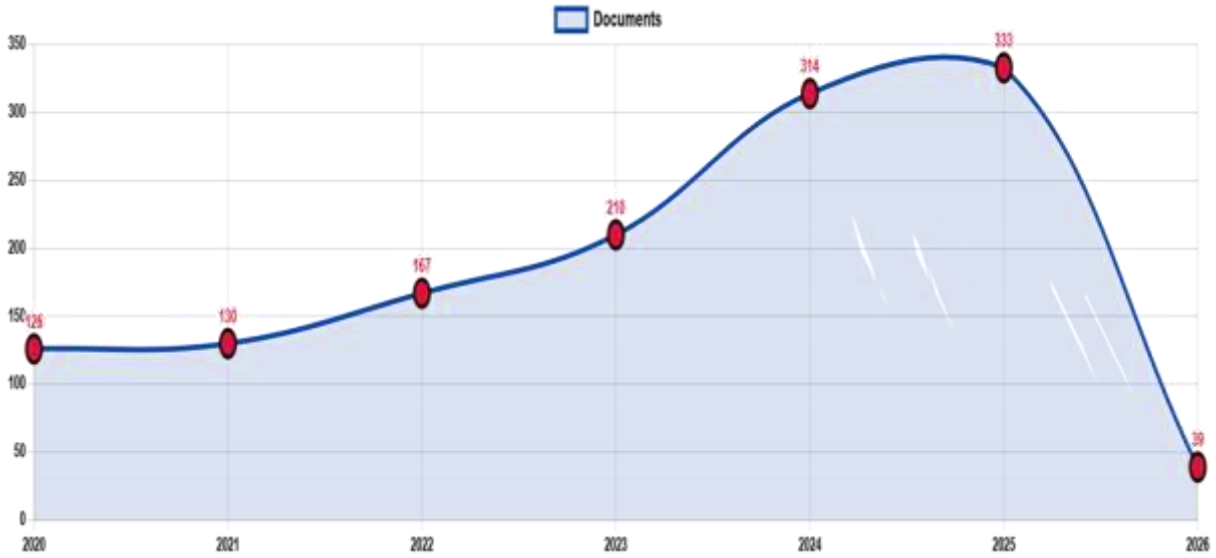

Figure 1: Annual Publication Trend of Gamification in Language

Source: Author's Analysis Based on Scopus Database (2020–2026)

Influential Authors write the most cited articles and the highest citations in Gamification in Language

Based on the table, Chu, S.K.W. is the author who received the highest number of citations, which is 169 citations despite only publishing 9 articles, showing a significant level of influence in the field of gamification of language learning compared to other authors listed. In terms of average citations per article, Zhang, Y. recorded the highest value with an average of 28.40 citations for 5 publications, which illustrates that each published work has a high impact individually. The comparison between the total number of citations and the average citations per article shows two different forms of academic influence, namely cumulative influence which refers to continuous contributions through the total number of citations, and intensive influence which refers to the level of profound impact for each publication. This analysis is in line with the performance analysis approach in bibliometric studies which evaluates both productivity indicators and citation impact as a measure of scholarly influence in a field of research.

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Table 1: Influential Authors write the most cited articles and the highest citations in Gamification in Language

Rank	Author	Publications	Citations	Avg Citations
1	Bucchiarone, A.	12	57	4.75
2	Queirós, R.	10	47	4.70
3	Chu, S.K.W.	9	169	18.78
4	Chen, Y.	8	94	11.75
5	Li, X.	6	68	11.33
6	Swacha, J.	6	38	6.33
7	Zhang, Y.	5	142	28.40
8	Qiao, S.	5	87	17.40
9	Yeung, S.S.-S.	5	87	17.40
10	Torchiano, M.	5	16	3.20

Source: Author's Analysis Based on Scopus Database (2020–2026)

Top Contributing Institutions in Gamification in Language

Based on the "Documents by Affiliation" graph, the National University of Singapore (NUS) recorded the highest number of publications in the field of gamification of language learning, thus indicating the institution's position as the most active and dominant in terms of publication contribution throughout the study period. This position is followed by Universiti Kebangsaan Malaysia (UKM) and Universiti Sains Malaysia (USM) which also recorded high levels of publication productivity, although the number is still lower than NUS. This pattern reflects the consistent involvement of several major institutions in driving research developments in this field. Overall, these findings illustrate the capacity and commitment of certain institutions in leading research on gamification of language learning, while also indicating that the growth of this field is not only global, but is also strengthened by regional institutions with strong research capabilities and collaborative networks.

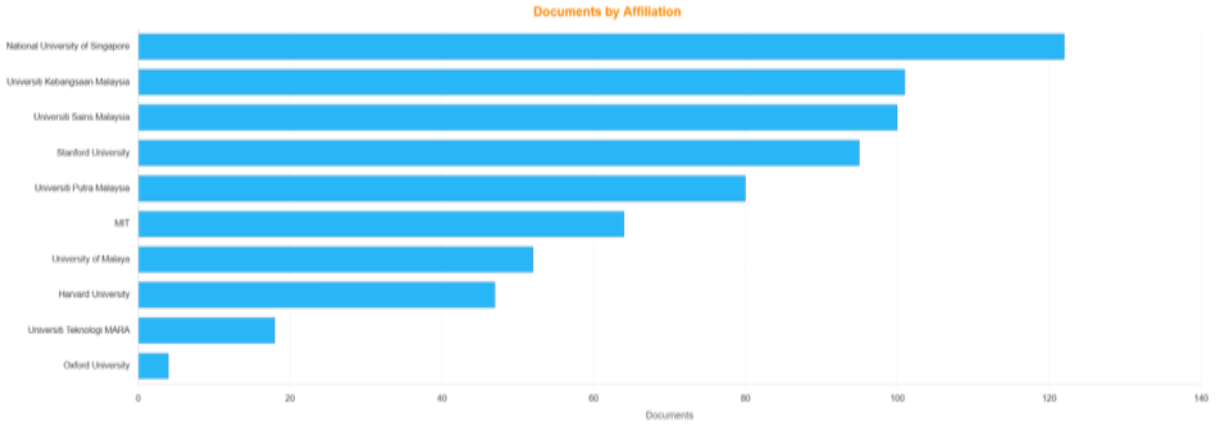

Figure 2: Top Contributing Institutions

Source: Author's Analysis Based on Scopus Database (2020–2026)

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Network Visualization

Intellectual Structure of Gamification in Language Learning Research Based on Keyword Co-occurrence Analysis

This network visualization displays the intellectual structure of gamification research in language learning based on keyword co-occurrence analysis, where each node represents a keyword and the size of the node reflects its frequency of occurrence in the literature. The larger nodes in the middle of the network depict dominant core concepts and are the main focus of the field, while the connecting lines indicate co-occurrence relationships between keywords in the same article. The variety of colors in the network forms several theme clusters that reflect interrelated subfields or research focuses, such as pedagogical aspects, motivation, learning technology and the effectiveness of gamification interventions. The density of the network and the existence of cross-links between clusters indicate that this field is developing in an integrated and interconnected manner, rather than in the form of isolated studies. The formation of color clusters is based on the strength of co-occurrence relationships analyzed through the software's internal clustering algorithm, and only keywords that meet a minimum frequency threshold are included to ensure the stability and readability of the network. Overall, this visualization shows that gamification research in language learning has a complex and layered conceptual structure, with several dominant concepts that function as links between various research themes.

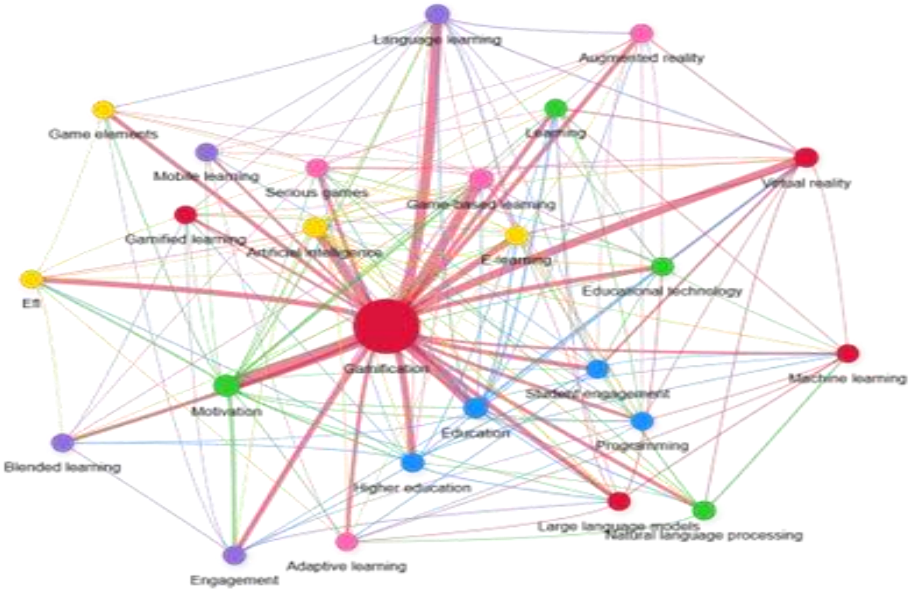

Figure 3: Co-occurrence of the keywords in Gamification in Language Learning
Source: Author's Analysis Based on Scopus Database (2020–2026)

Collaborative Structure of Gamification Research in Language Learning Based on Co-authorship Network Analysis

This network visualization shows the collaborative structure of gamification research in language learning based on co-authorship analysis, where each node represents an author and the size of the node reflects the relative level of productivity or influence in the network, while the connecting lines indicate the collaborative relationships and strength of collaboration between authors. The analysis shows the existence of a main cluster centered on Chu, S.K.W., who has strong collaborative relationships with several other authors such as Qiao, S., Yeung,

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S.S.-S., and Li, X., thus indicating its role as a key connecting node in the network. In addition, there are smaller and more focused clusters, for example the collaboration between Queirós, R. and Swacha, J., which reflect collaboration on a more limited scale. Several other authors are located at the periphery of the network with a lower number of collaborative relationships, indicating a moderate level of integration in this research community. Overall, the network structure shows several interconnected groups of researchers with one or two core nodes connecting the wider network, and this concentration on a few key authors reflects the existence of core collaborative structures commonly found in emerging research fields, where a small number of researchers play a key role in spreading ideas and strengthening the scholarly community.

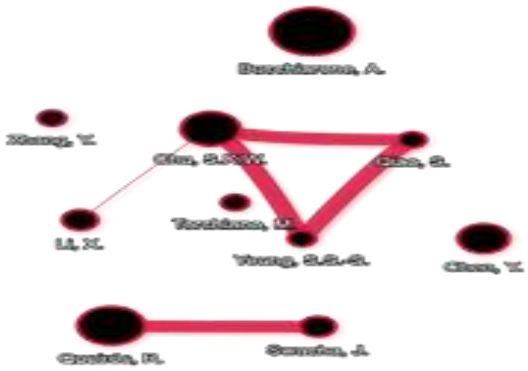

Figure 4: Co-Authorship Network Based on Bibliometric Analysis of Gamification Research in Language Learning

Source: Generated Using BiblioPro Version 1 Based on Scopus Database (2020–2026)

International Collaboration Structure in Gamification Research in Language Learning Based on Country Co-authorship Analysis

This network visualization depicts the structure of international collaboration in language learning gamification research based on cross-country co-authorship analysis, where each node represents a country and the size of the node reflects the level of contribution in joint publications, while the connecting lines indicate the collaborative relationships and strength of collaboration between countries. The network shows interconnected relationships between several key countries such as Malaysia, Indonesia, Singapore, India and Spain that are drivers of regional and international collaboration, in addition to the involvement of countries such as the United States, the United Kingdom, China, Germany, Japan and Australia that show significant cross-linkages in the global network. The density of connections between Asian and European countries illustrates that research in this field is developing through active international networks and is not limited to a particular geographical block. Overall, this structure shows that the field of gamification in language learning is developing in the context of internationalization of research, with several countries acting as key connecting nodes that strengthen integration and knowledge exchange across borders.

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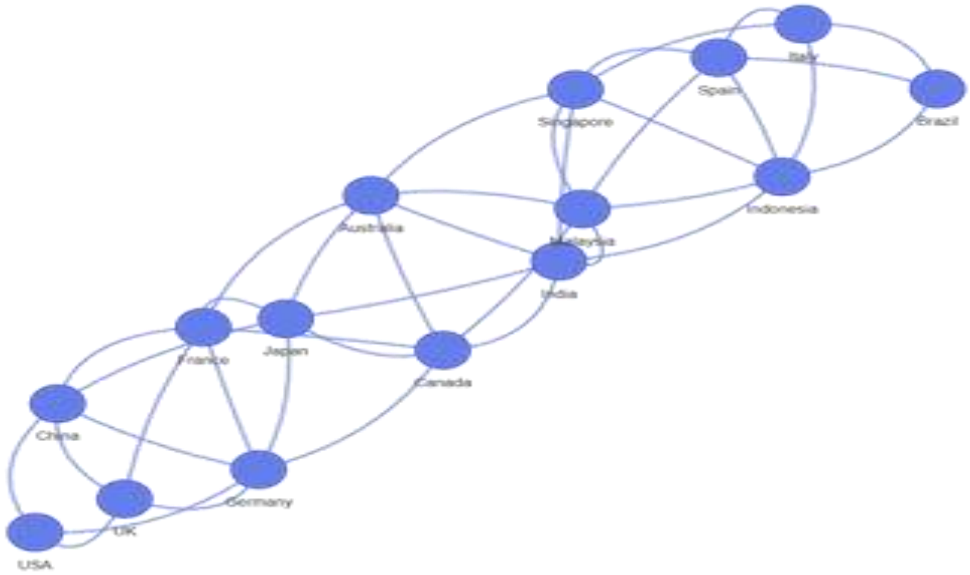

Figure 5: International Collaboration Network in Gamification Research in Language Learning

Source: Generated Using BiblioPro Version 1 Based on Scopus Database (2020–2026)

Keywords Analysis

The keyword analysis table shows that "Gamification" is the most dominant keyword with 658 frequencies, far surpassing other keywords and emphasizing that the topic is the core of the field under study. This dominance is expected given that the term is the main keyword in the search strategy used; therefore, a more meaningful interpretation is obtained through secondary keyword analysis and the formation of theme clusters that reflect the true conceptual focus of this field. The second highest keyword is "Motivation" (79), followed by "Education", "Artificial intelligence", and "Game-based learning" which each recorded 50 frequencies, indicating that pedagogical aspects and the integration of smart technology are also important focuses in research. In addition, terms such as "Language learning" (46) and "Virtual reality" (43) reflect the expansion of research towards the context of language learning and the use of immersive technology. The presence of keywords such as "Natural language processing", "Higher education", and "E-learning" also indicates a research tendency towards the application of digital technology in higher education environments. Overall, this analysis shows that research in this field is centered on gamification as a core concept, with a broad focus on motivation, smart technology integration, and digital learning innovation in the educational context.

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Table 2: Keywords Analysis

Rank	Keyword	Occurrences
1	Gamification	658
2	Motivation	79
3	Education	50
4	Artificial intelligence	50
5	Game-based learning	50
6	Language learning	46
7	Virtual reality	43
8	Natural language processing	33
9	Higher education	32
10	E-learning	31

Source: Author's Analysis Based on Scopus Database (2020–2026)

Theme Analysis

Comparative Analysis of Dominant Themes in Gamification Research

The chart "Comparative Analysis of Dominant Themes in Gamification Research" shows that one major theme dominates the research landscape with 1363 frequencies, far surpassing the other recorded themes. The second theme recorded 448 frequencies, showing a significant gap between the most dominant theme and the next theme. Subsequently, the other themes recorded much lower numbers, namely 96, 40, 38 and 26 frequencies, thus illustrating the unbalanced concentration of research in this field. The large difference between the major theme and the other themes indicates that most studies are concentrated on one core focus, while other themes serve as supporting or complementary branches. This pattern reflects that although gamification research is actively developing, exploration of alternative themes is still relatively limited and has the potential to be expanded to create balance and diversity in future research directions.

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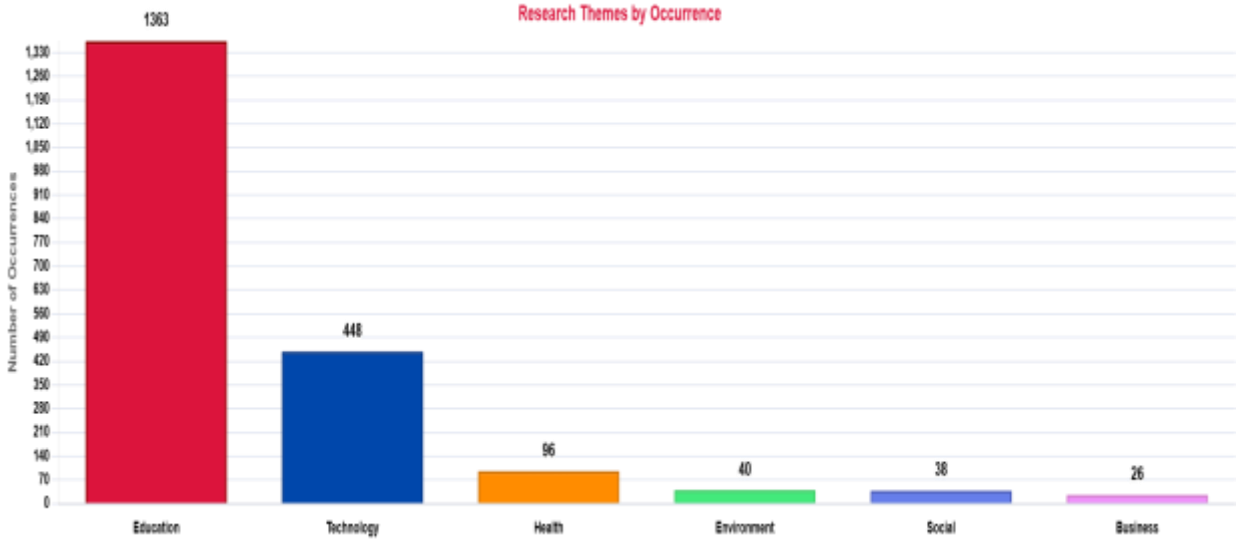

Figure 6: Comparative Analysis of Dominant Themes in Gamification Research within Language Learning

Source: Generated Using BiblioPro Version 1 Based on Scopus Database (2020–2026)

Thematic Cluster Identification through Keyword Co-occurrence Analysis

The table "Identification of Theme Clusters through Keyword Co-occurrence Analysis" shows that the Education theme cluster is the most dominant with 1363 frequencies and 740 documents, representing 56.1% of the total study, thus emphasizing that the educational context is the main focus of gamification research. The second largest cluster is Technology with 448 frequencies and 365 documents (27.7%), reflecting the important role of technology integration in supporting the implementation of gamification. Next, the Health cluster recorded 96 frequencies (4.9%), followed by Environment (40 frequencies, 3.0%), Social (38 frequencies, 2.7%) and Business (26 frequencies, 1.8%), indicating that exploration in these domains is still relatively limited. This distribution pattern shows that although gamification is applied in various fields, the research focus is still significantly concentrated on the education sector, while other clusters function as supporting or extension domains of application. Overall, this cluster analysis depicts an unbalanced thematic structure with a strong dominance of the education sector as well as great potential to expand research in other domains that are still underexplored.

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Table 3: Thematic Cluster Identification through Keyword Co-occurrence Analysis

Theme	Occurrences	Documents	% of Total
Education	1363	740	56.1%
Technology	448	365	27.7%
Health	96	65	4.9%
Environment	40	40	3.0%
Social	38	35	2.7%
Business	26	24	1.8%

Source: Generated Using BiblioPro Version 1 Based on Scopus Database (2020–2026)

Thematic Distribution and Research Orientation in Gamification Studies

The chart "Thematic Distribution and Research Orientation in Gamification Studies" shows that gamification research is significantly focused on the Education theme which accounts for the largest share of the overall distribution, thus indicating that most studies are conducted in the context of teaching, learning and pedagogical innovation. The Technology theme emerges as the second largest orientation, reflecting the important role of technology as a medium for implementing and strengthening gamification applications. Next, themes such as Health, Environment, Social and Business only account for a small share of the overall distribution, indicating that gamification applications in these domains are still relatively limited and have not been widely explored. This distribution pattern shows that the current research landscape tends to focus on the education sector with the support of digital technology, while other areas have significant potential to be expanded to create diversity and balance in the direction of gamification research in the future.

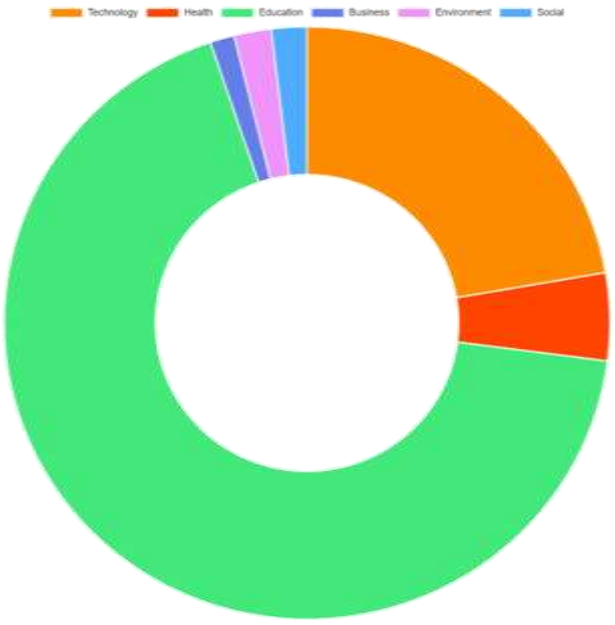

Figure 7: Thematic Distribution and Research Orientation in Gamification Studies within Language Learning

Source: Generated Using BiblioPro Version 1 Based on Scopus Database (2020–2026)

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Top Contributing Journals in Gamification Research

An analysis of the major contributing journals in gamification research shows that Lecture Notes in Computer Science (LNCS) (including sub-series in Artificial Intelligence and Bioinformatics) ranks first in terms of number of publications (54) and citations (94), thus reflecting the dominance of computer science and technology disciplines in the gamification research landscape. This position is followed by Lecture Notes in Networks and Systems with 51 publications and 60 citations, which also reinforces the research bias towards digital systems and technologies. However, in terms of average citation impact, the journal Education and Information Technologies shows a very significant influence with 349 citations for 16 publications (average 21.81 citations), followed by Sustainability (Switzerland) with an average 20.14 citations, thus reflecting a high level of impact in the context of education and sustainability. In addition, the ACM International Conference Proceedings Series also showed a strong performance with 127 citations and an average of 4.54 citations. Overall, these findings indicate that although publications in the fields of computer science and technology dominate in terms of quantity, journals oriented towards education and sustainability have higher citation influence, thus reflecting the integration of technology and education as the main thrust of gamification research development.

Table 4: Top 10 Contributing Journals in Gamification Research

Rank	Journal	Publications	Citations	Avg Citations
1	Lecture Notes in Computer Science (including subseries Lecture Notes in Artificial Intelligence and Lecture Notes in Bioinformatics)	54	94	1.74
2	Lecture Notes in Networks and Systems	51	60	1.18
3	Communications in Computer and Information Science	28	23	0.82
4	ACM International Conference Proceeding Series	28	127	4.54
5	Lecture Notes in Computer Science	17	8	0.47
6	Education and Information Technologies	16	349	21.81
7	Sustainability (Switzerland)	14	282	20.14
8	CEUR Workshop Proceedings	14	52	3.71
9	AIP Conference Proceedings	12	7	0.58
10	Smart Innovation, Systems and Technologies	11	33	3.00

Source: Author's Analysis Based on Scopus Database (2020–2026)

Discussion

The findings show that gamification research in language learning for the period 2020 to 2026 shows consistent growth, with a significant increase in the number of publications after 2020. This pattern reflects the increasing academic interest in integrating game elements in the context of digital education, especially in the post-pandemic era that has accelerated technological transformation in the classroom. This growth trend is in line with previous observations that gamification is increasingly accepted as a pedagogical approach with the potential to increase student motivation and engagement (Sailer & Homner, 2020).

Thematic cluster analysis shows that the main focus of research is still focused on the context of formal education, with an emphasis on technology-based language learning and digital

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activity design. The dominance of the education cluster indicates that the field is still in a pedagogical consolidation phase, where researchers pay attention to the effectiveness of interventions and instructional design. However, the imbalance between the main cluster and supporting clusters such as health, social, and business suggests that cross-domain exploration is still limited. From a bibliometric perspective, this situation can be interpreted as an early consolidation phase in the development of the field.

In terms of collaborative networks, co-authorship analysis shows that international collaboration is growing, but is still concentrated in certain countries and institutions. This situation suggests that intellectual influence in this field is still driven by a few dominant nodes. Such a network structure is consistent with the findings of bibliometric analyses in other fields that indicate the existence of major centers of influence in shaping the research agenda (Donthu et al., 2021).

The theoretical implications of this study are significant as it provides a macro picture of the intellectual structure of gamification research in language learning. By identifying clusters of themes and citation patterns, this study helps clarify the conceptual direction of the field and reduce the fragmentation of knowledge that was previously segregated according to specific skills or contexts. From a practical perspective, this mapping can help researchers and education policymakers identify underexplored areas and plan more interdisciplinary research.

Although this study provides a comprehensive picture based on Scopus data, there are several limitations that need to be acknowledged. The analysis is limited to a single database and English-language articles only, which may exclude publications in other languages or alternative databases. Future studies could consider integrating multiple databases such as Web of Science or Dimensions to broaden the scope of the analysis. Additionally, advanced analyses that combine bibliometric approaches with in-depth content analysis could provide a more comprehensive understanding of the evolution of gamification theory and design in language learning.

Conclusions

This bibliometric study successfully mapped the research landscape of gamification in language learning comprehensively, encompassing publication patterns, influential authors, major contributing institutions, intellectual structure and distribution of research themes. The findings show that this field is rapidly developing with a clear dominance in the educational context and the integration of digital technology as the main driver of gamification implementation. Although the international collaboration structure shows the development of active global networks, the uneven distribution of themes indicates the need to expand exploration into other domains that are still understudied. Accordingly, this study provides a solid empirical foundation for framing a more structured, diverse and high-impact future research agenda in the field of gamification of language learning.

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