

GLOBAL TRENDS AND IMPACTS OF GAMIFICATION IN LANGUAGE LEARNING: A BIBLIOMETRIC ANALYSIS

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ABSTRACT

The research investigated global trends and impacts of gamification in language learning, focusing on how research in this area has evolved over the past two decades (2000–2024). A bibliometric approach was adopted, utilizing data from the Scopus database and applying the Preferred Reporting Items for Systematic reviews and Meta-Analyses (PRISMA) framework to identify and include 358 relevant articles systematically. The research applied bibliometric tools, VOSviewer and Bibliometrix, to analyze collaboration networks, keyword associations, and publication trends. The findings reveal significant growth in gamification research, with a sharp increase in publications between 2015 and 2020, driven by advancements in digital learning technologies. Countries like the United States, Spain, Indonesia, and Malaysia emerged as key contributors. Gamification enhanced motivation, engagement, and learning outcomes, particularly in vocabulary and grammar instruction, while its impact on speaking skills remains underexplored. Cultural, technological, and policy factors were found to influence the adoption of gamification, suggesting that localized strategies are essential for effective implementation. This research offers original insights into the global development and application of gamification in language learning. It highlights gaps that require further exploration, such as its use in advanced language skills and technology-limited settings. The findings provide practical implications for educators, curriculum developers, and policymakers to design inclusive and adaptive gamification strategies that address diverse educational contexts.

Keywords: gamification, language learning, bibliometric analysis, educational technology, VOSviewer

INTRODUCTION

In the past decade, gamification has emerged as a significant innovation in education, particularly in language learning. Gamification, which refers to applying game elements in non-game contexts, has enhanced student engagement and motivation through a more interactive and enjoyable approach (Fitria, 2023). With the integration of digital technology, gamification is now widely utilized across various language learning platforms, including online applications like Duolingo, which provides daily challenges and rewards to motivate users to learn independently (Shortt et al., 2023). Elements like levels, leaderboards, and rewards effectively boost student motivation and engagement (Sailer & Homner,

2020; Shortt et al., 2023). Furthermore, gamification promotes social connectedness and competence, especially in online education (Mahmud et al., 2020).

Traditional language learning often faces challenges in maintaining student engagement, especially in repetitive tasks such as vocabulary and grammar acquisition. Gamification offers a solution by incorporating a system of rewards and challenges that encourage students to engage actively in their learning. This approach delivers instant feedback, accelerating language acquisition (Huang et al., 2020). It has proven especially effective in improving language learning outcomes across various educational levels, as shown by several meta-analyses (Luo, 2023; Sailer & Homner, 2020).

The relevance of gamification is becoming

more apparent in 21st-century education, particularly with the growing use of online learning and app-based technologies like Duolingo and other mobile learning applications (Shortt et al., 2023). These platforms offer flexibility in learning and support a more personalized learning process, allowing students to learn anytime and anywhere through mobile devices (Luo, 2023; Shortt et al., 2023). In many cases, students have shown significant increases in motivation when using gamification-based applications for learning foreign languages (Luo, 2023; Sailer & Homner, 2020). The COVID-19 pandemic has further accelerated the transition to online learning, where gamification methods have played a crucial role in maintaining student motivation and engagement in virtual learning environments (Topushipambao, 2022).

Past research has found that learning outcomes may vary depending on the game elements used, students' backgrounds, and the learning design employed (Huang et al., 2020; Luo, 2023). Meta-analyses indicated that factors such as social moderation, collaboration, and competition can influence the effectiveness of gamification in language learning (Huang et al., 2020; Luo, 2023).

As gamification becomes increasingly popular in language learning, it is essential to understand its global development and impact on education. Bibliometric analysis is pivotal in this process. This approach allows researchers to map the existing literature, identify prominent authors and institutions, and understand how research on gamification in language education has shifted over time (Huang et al., 2020). Through this approach, people can explore key questions such as; how have global trends in gamification research in language learning evolved from 2000 to 2024? and what is the impact of gamification on language learning outcomes? Additionally, this research aims to identify the most influential researchers and institutions to understand how their contributions have shaped the global trends and impacts of gamification in language learning.

This research aims to answer these questions by mapping global trends and analyzing the impact of gamification in language learning through a bibliometric approach. By analyzing the existing literature, this research provide insights into the evolution of research in gamification, identify the most productive countries and institutions, and evaluate the influence of gamification on language acquisition. The findings are expected to guide educators, curriculum developers, and policymakers in leveraging gamification to enhance language learning effectiveness.

Gamification has rapidly evolved as an innovative approach in education. Applying game elements such as points, badges, levels, and challenges in non-game contexts aims to enhance students' motivation, engagement, and learning outcomes. Gamification seeks to transform passive and monotonous learning into a more interactive and enjoyable experience, especially in language learning (Chen & Zhao, 2022;

Grosseck et al., 2020).

In language learning, gamification has become increasingly popular as it addresses common challenges in traditional methods, such as a lack of student engagement. Repetition in learning vocabulary or grammar often causes boredom, and gamification offers a fresh approach. Gamification in language learning creates a more engaging learning atmosphere, stimulates students' intrinsic motivation, and encourages active involvement (Gupta & Goyal, 2022). Applications like Duolingo have successfully integrated gamification elements like daily challenges, leaderboards, and rewards to motivate students to learn languages independently. Also, users can participate in daily challenges and earn rewards for learning achievements (Shi & Cristea, 2016).

Digital technology plays a crucial role in the implementation of gamification in education. With the rise of online learning applications and platforms, gamification adoption is becoming more widespread. Game-based learning enables students to learn anytime and anywhere, transforming how they interact with language learning materials, particularly with challenging and motivating gamification features (Grosseck et al., 2020).

Gamification in language learning refers to using game elements to improve the effectiveness and efficiency of foreign language learning. Points, badges, leaderboards, and levels are some of the core components applied in gamified learning (Tan, 2018). Points and badges reward students for their achievements, such as completing tasks or reaching specific goals in language learning. These rewards serve as recognition of students' efforts and help build a sense of accomplishment that drives motivation (Chen & Zhao, 2022). Another key element is the leaderboard, which allows students to engage in healthy competition with peers. Such competition adds an extra incentive to keep learning, as students are motivated to improve their rankings among friends (Gupta & Goyal, 2022). Additionally, gamification introduces levels and challenges, creating a progressively challenging pathway as skills improve. With progressively advancing levels, learning becomes more dynamic, enabling students to enhance their language abilities gradually (Tan, 2018).

These gamification elements facilitate personalized and self-paced learning, significantly impacting intrinsic motivation and increasing student participation in language learning (Denden et al., 2020). Independent learning and game-like challenges encourage students to keep progressing and maximize their learning potential (Gupta & Goyal, 2022).

Gamification in education is closely related to self-determination theory (SDT), developed by Ryan and Deci. (2000). Based on SDT, three basic psychological needs are underlying intrinsic motivation: competence, autonomy, and social relatedness (Chen & Zhao, 2022; Denden et al., 2020). Gamification addresses the need for competence by providing challenges that match an individual's

abilities, allowing them to feel more competent after completing tasks. Students who achieve in-game goals receive instant feedback that reinforces their sense of accomplishment (Gupta & Goyal, 2022).

Additionally, gamification fosters autonomy by allowing students to manage their learning process. They can choose when and how to learn, giving them greater control over their learning experience. This feature is evident in applications like Duolingo, where users can choose their learning paths and pace (Tan, 2018). Lastly, social relatedness is promoted through elements like leaderboards or group challenges, which enable social interactions that promote competition and collaboration, providing social experiences that enhance motivation (Gupta & Goyal, 2022).

In addition, gamification aligns with constructivist principles, where learners actively build knowledge through participation in interactive learning activities. Students can build a more profound and applicable language understanding through immediate feedback and tiered challenges (Denden et al., 2020).

METHODS

This research uses a bibliometric approach to examine global research trends and the effects of gamification in language learning. Bibliometric tools like VOSviewer and Bibliometrix are applied to analyze and visualize these trends and collaboration networks. VOSviewer is used primarily for visualizing relationships among researchers, keywords, and citations, providing detailed insights into collaboration patterns (Moral-Muñoz et al., 2020). It has been widely applied in bibliometric surveys on gamification in education, facilitating the identification of geographic distribution, research collaboration, and citation networks across different regions (Swacha, 2021). Meanwhile, Bibliometrix, a tool based on the R platform, supports more detailed quantitative analysis, including mapping citation patterns, key contributors, and thematic trends over time (Arruda et al., 2022). The integration of these tools facilitates thorough statistical analysis and compelling visual representations, fostering a deeper understanding of global trends research in gamification.

Data are collected from the Scopus database, covering publications between 2000 and 2024, a period chosen due to the significant growth of gamification research in education. The search used the keywords ‘Gamification AND Language,’ which yielded 1,283 documents. The Preferred Reporting Items for Systematic reviews and Meta-Analyses (PRISMA) framework is employed to ensure a rigorous and systematic process comprising four stages: identification, screening, eligibility, and inclusion (see Figure 1). All relevant documents, including journal articles, conference papers, and book chapters, are retrieved to maximize coverage in the identification stage. During the screening stage, 925 papers are excluded based on predefined criteria,

such as selecting only peer-reviewed journal articles, focusing on subjects within social sciences, arts, and humanities, and removing duplicates. The eligibility stage involves a detailed evaluation of 358 articles to confirm their relevance to the research focus. Finally, all 358 articles are included in the analysis, forming a robust dataset that underpins the research's conclusions.

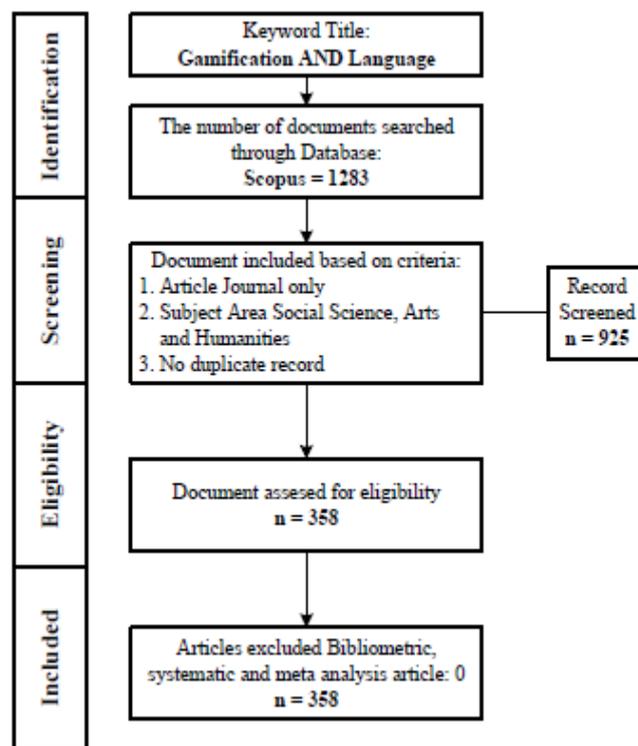


Figure 1 PRISMA Flow Diagram

In addition to analyzing global research trends, this research examines the impacts of gamification on language learning, as reported in the selected articles. Abstracts of the 358 articles are systematically reviewed to identify themes related to gamification's impact, including motivation, engagement, and learning outcomes. The qualitative content analysis focuses on categorizing reported impacts into cognitive (e.g., mastery of vocabulary and grammar), motivational (e.g., increased willingness to complete tasks), and social (e.g., enhanced peer interaction) dimensions. Each abstract is manually coded, and recurring patterns are identified to highlight dominant trends and variations in the reported impacts.

By integrating VOSviewer's visualization capabilities with Bibliometrix's analytical depth, the research provides a comprehensive perspective on global publication trends, geographic distribution of research, and the impacts of gamification in language learning. These methods are specifically chosen to address the research's objectives of mapping global research trends and analyzing the impacts of gamification on language learning. The

PRISMA framework ensures transparency and rigor in data selection. At the same time, the combination of bibliometric and qualitative methods enabled the identification of both broad trends and specific insights into how gamification influences language learning.

RESULTS AND DISCUSSIONS

The results highlight global research trends, collaboration networks, and key themes in gamification research in language learning. Additionally, the analysis identifies the most influential authors, institutions, and regions contributing to this field. The first aspect of this analysis is the examination of annual scientific production, which provides insights into the growth and evolution of gamification research over time. Understanding these trends is crucial, as they highlight the increasing attention the field has received and identify periods of significant growth, providing a foundation for future research directions.

Based on Figure 2, the distribution of publications related to gamification in language learning shows significant growth from 2012 to 2024. From 2012 to 2016, the number of publications was very low, almost nonexistent, indicating that this topic was still in its early stages of development. During this period, gamification had not yet become a significant focus of research in language learning and was not widely used or understood by academics and educational practitioners.

However, this trend began to shift in 2017, when the number of publications increased. The first notable spike occurred in 2018, marking a growing interest among researchers in using gamification in educational contexts, particularly in language learning. A more drastic surge occurred between 2020 and 2022, with the number of publications peaking at over 60 articles per year in 2022. This research trend reflects the increased attention and adoption of gamification methods across various educational settings.

One of the primary factors contributing to this significant increase between 2020 and 2022 is the impact of the COVID-19 pandemic, which dramatically changed education practices. The pandemic forces a large-scale shift to online learning, making digital technology, including gamification, an essential tool for maintaining student engagement in remote learning environments. Gamification emerges as an effective strategy for enhancing student motivation and engagement in online learning, spurring more research in this area.

Additionally, rapid advancements in mobile technology and the rise of gamification-based learning applications, such as Duolingo, play a crucial role in driving the adoption of gamification in language learning. These applications offer more interactive and challenging learning methods, effectively supporting language learning. As the use of technology in education expanded, gamification became an attractive research topic for academics, explaining the surge in publications.

Overall, Figure 2 shows that gamification in language learning has evolved into a significant research field, particularly since the onset of the COVID-19 pandemic, driven by the shift to online learning and the development of digital technology. The recent surge in publications indicates that this topic continues to garner attention, with the trend likely to persist as learning technologies continue to advance in the future.

The three data sets — article production by country, top institutional affiliations, and international collaboration—offer a comprehensive view of research development on gamification in language learning. Each graph (see figure 2) provides different insights, but their interconnections become more evident when analyzed in-depth.

Figure 3 highlights the article production by country, showcasing the most productive nations in publishing research on gamification in language learning. Countries like the United States (U.S.),

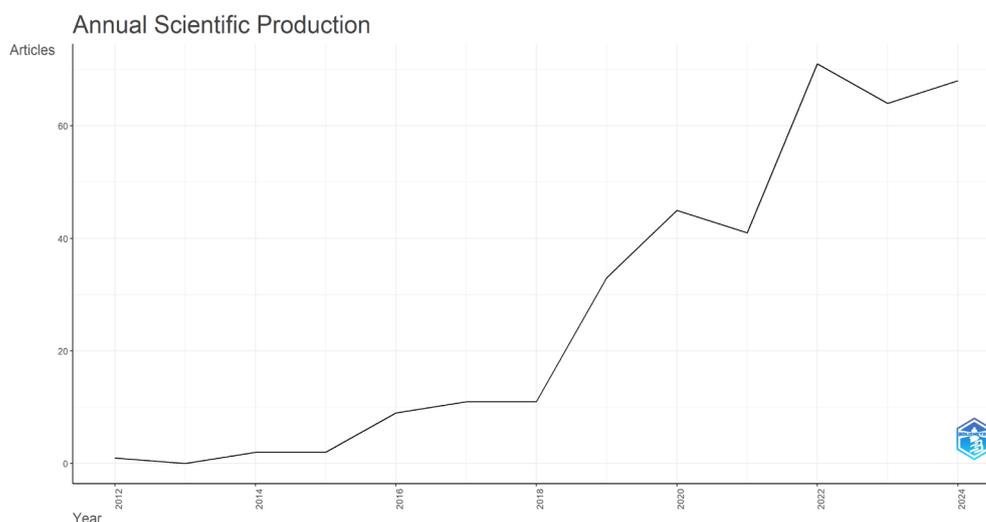


Figure 2 Annual Scientific Production of Gamification Studies

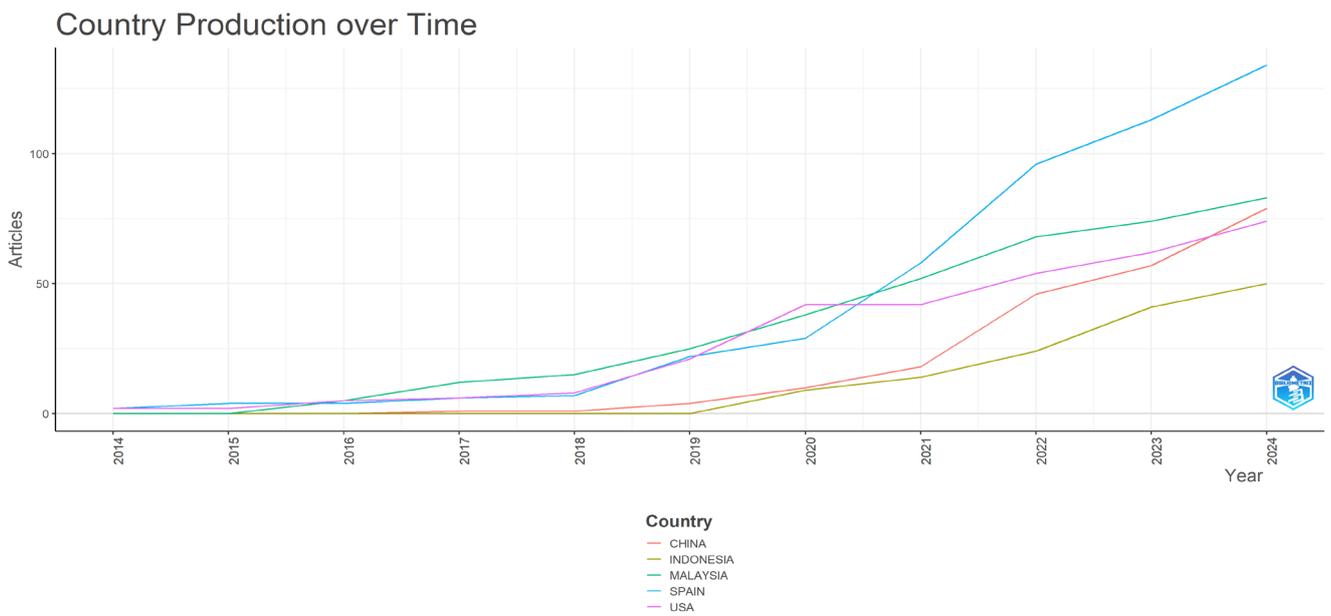


Figure 3 Article Production by Country

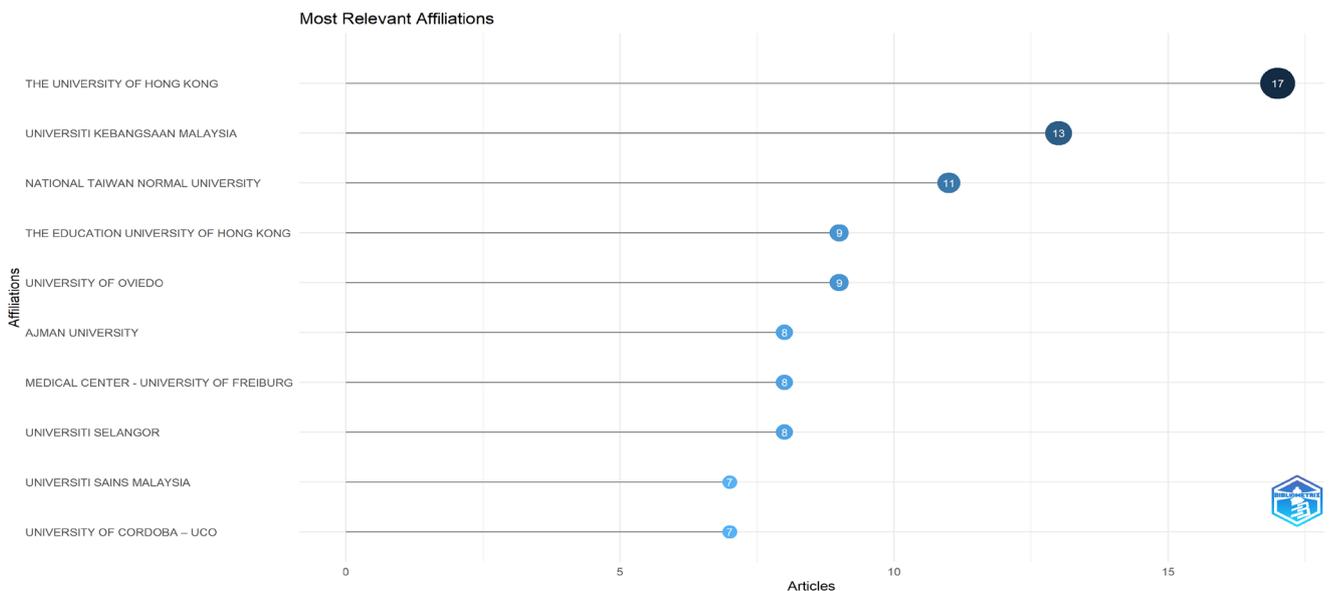


Figure 4 Top Institutional Affiliations

Spain, Indonesia, Malaysia, and China hold the top positions with significant growth in publication numbers, especially since 2020. The increase can be linked to advancements in educational technology and the broader adoption of gamification in these countries. The COVID-19 pandemic also plays a significant role in driving the surge in research, as it forced a shift towards online learning and the use of gamification elements to maintain student engagement in digital learning environments.

For instance, U.S. and Spain lead in the total number of articles published, with U.S. being the most prolific. This trend may suggest a greater emphasis on gamification research and its application in education, bolstered by robust digital education infrastructures. Meanwhile, Indonesia and Malaysia have also shown

significant growth in research contributions, indicating the increasing adoption of technology in Southeast Asia.

Figure 4 illustrates the institutions that are most active in publishing research related to gamification. Notably, The University of Hong Kong and Universiti Kebangsaan Malaysia (UKM) stand out as the most productive institutions, with 17 and 13 articles, respectively. These institutions are highly committed to researching and developing gamification in education, even though the countries where these institutions are based (Hong Kong and Malaysia) do not necessarily top the list of article production by country.

Interestingly, some countries with high publication numbers, such as the U.S. and China, do not have institutions dominating the top affiliation list.

This suggests that publications from these countries may be more dispersed across various institutions rather than concentrated in one or two universities. Conversely, Hong Kong and Taiwan institutions have a more focused approach, with certain key institutions being highly active in gamification research.

The graph in Figure 5 provides an overview of international collaboration between researchers from different countries in gamification research. The U.S. is a central collaboration hub with strong connections to countries such as Indonesia, China, Malaysia, and Spain. This strong collaboration is one of the reasons why U.S. leads in total publication numbers. Even though U.S. institutions do not dominate the top affiliation list, extensive international collaboration ensures that U.S.-based researchers are involved in many research projects that are eventually published.

Meanwhile, countries like Spain have strong collaborative ties with other European nations, such as Italy and Estonia. This regional collaboration in Europe may explain why Spain has many publications, particularly in gamification research. In Asia, collaboration between countries like Indonesia, Malaysia, and China with U.S. shows that gamification research in the region is not only being developed at the national level but also involves broader international collaboration.

The connections between these three data sets can be observed in the collaboration and publication distribution patterns. Countries with strong collaborative ties, such as U.S. and Spain, tend to have higher publication numbers even though their institutions may not always dominate the top affiliation list. This indicates that publication contributions come not only from centralized institutions but also from extensive cross-country collaborations. Conversely, some countries with highly productive institutions, such as Hong Kong and Taiwan, have a more focused research effort concentrated in a few leading institutions but may lack the broader international collaboration

seen in countries like the U.S. or Spain.

These graphs demonstrate that developing research on gamification in language learning is heavily influenced by international collaboration networks, institutional involvement, and the research focus in each country. Cross-country collaboration plays a key role in expanding research impact. At the same time, leading institutions in certain countries can significantly drive up publication numbers, even if the country does not have the same volume of publications as others.

According to Figure 6, several authors stand out as the most productive contributors in the field of gamification in language learning. Chu SKW emerges as the most prolific author, with eight published documents. Chu's contributions are critical in enriching the literature on gamification, particularly in terms of both empirical and theoretical research regarding the effectiveness of gamification in enhancing student engagement and learning outcomes. Other prominent contributors include Kitsnik M, with six articles, and Soboleva EV and Lopez-Bouzas N, each with four articles. These authors have significantly contributed to advancing research on gamification in language learning.

Their research has directed academic attention toward specific topics, such as how game elements can be effectively implemented in language learning. These authors are likely instrumental in popularizing gamification through educational technology applications and developing new models other researchers adopt worldwide. Given the high number of articles published by these authors, they have shaped the research trends, especially concerning the design of interactive learning experiences.

Figure 7, which shows the most relevant journals, highlights Education and Information Technologies as the top journal, with 15 published documents. Information Technologies journal, focusing on information technology in education,

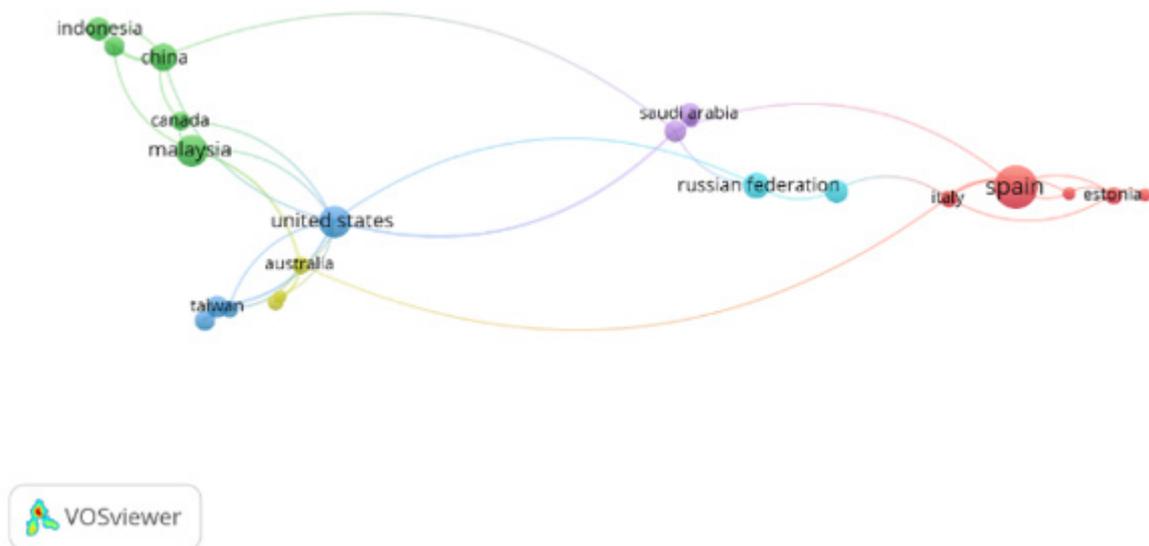


Figure 5 International Collaboration

is central to disseminating the latest knowledge and findings related to gamification in language learning. It likely serves as the preferred platform for researchers in educational technology to publish their findings on the effectiveness of gamification as a learning strategy.

Other influential journals include the International Journal of Emerging Technologies in Learning and Sustainability, with 12 and 11 articles published, respectively. These journals focus on education and encompass technology and sustainability aspects, which are highly relevant in gamification research. They offer platforms to discuss the long-term impact of game-based technology applications in language learning from technological and social sustainability perspectives.

The most productive authors and journals in gamification in language learning significantly influence the research direction in this area. They help set the main research topics, such as how game elements

(e.g., points, levels, and rewards) can be effectively integrated into the learning process to enhance student motivation. Furthermore, these authors and journals have been key in promoting various gamification applications that help students engage in independent and interactive language learning, particularly in the context of online learning and mobile learning, which have become increasingly popular in recent years.

The influence of these authors and journals can also be seen in forming a global research community that is increasingly interested in applying innovative technologies in education. Their publications provide the conceptual and methodological groundwork for other researchers to explore further how gamification can be more effectively utilized in various educational contexts, including language learning.

Overall, these authors and journals play a critical role in shaping the academic discourse on gamification, driving forward research that expands

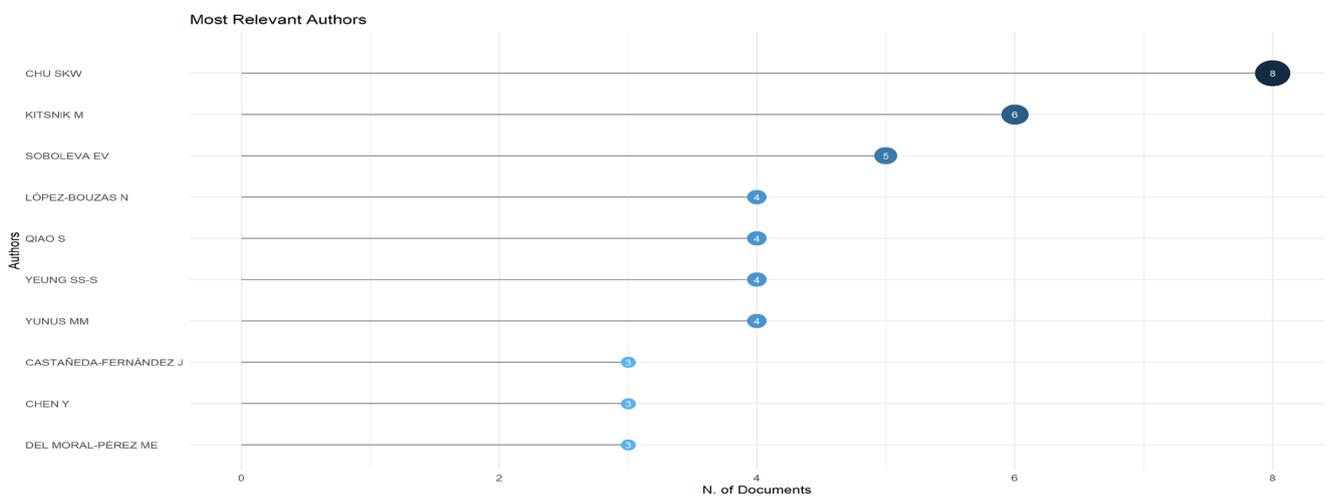


Figure 6 Productive Authors

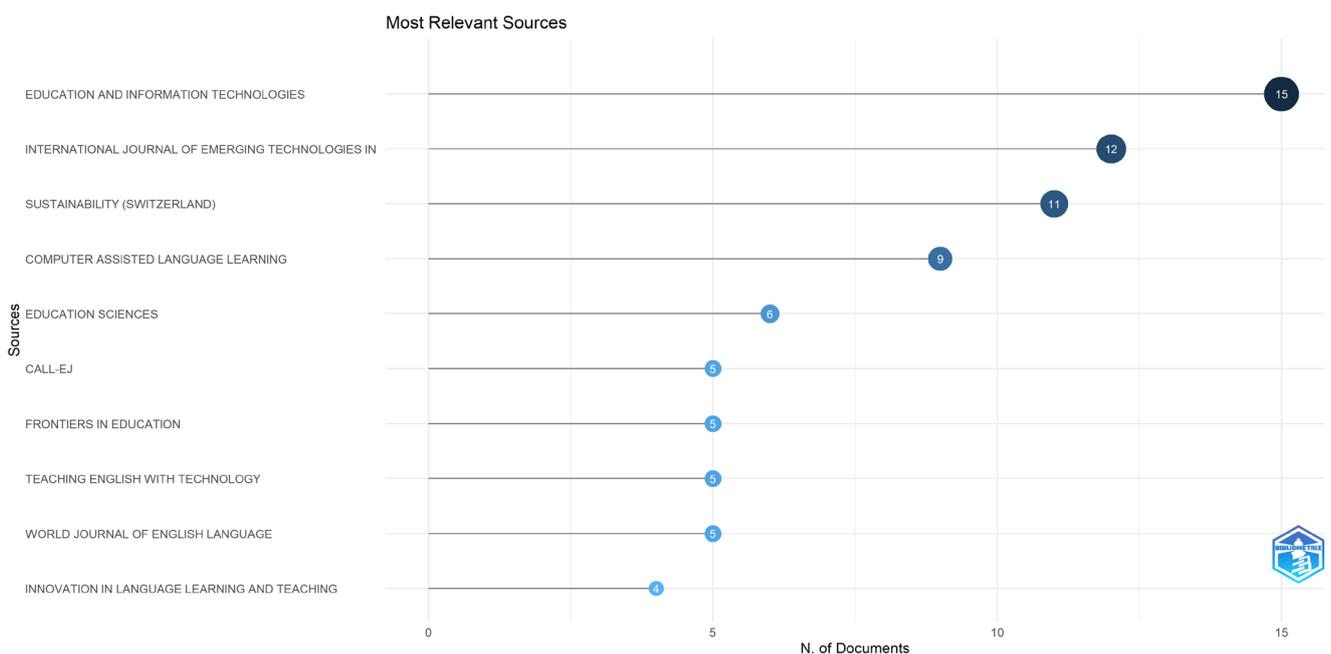


Figure 7 Productive Journals

approach, gamification remains a growing trend in language learning in the digital era.

Gamification in language learning has experienced rapid global growth, particularly after 2020. This surge was driven by the need for more interactive learning methods during the mass shift to online education due to the COVID-19 pandemic. Countries such as U.S., Spain, and several Asian nations like Indonesia and Malaysia showed significant increases in scientific publications on gamification in language education. This indicates that gamification has been widely adopted worldwide in developed and developing countries as part of a technology-based learning solution.

Aside from the pandemic, this growth is also fueled by accelerated technology adoption in education. In technologically advanced countries like U.S. and Western Europe, gamification is facilitated by widespread access to educational technology. In these regions, educational policies support innovative learning methods, including gamification. Furthermore, the demand for more engaging approaches for the digital generation, which has grown with technology and games, also contributes to this trend.

In contrast, developing countries such as Indonesia and Malaysia are catching up in their adoption of gamification. Although they face challenges such as limited access to technology, these countries demonstrate a strong commitment to leveraging gamification to improve the quality of language education. Governments and educational institutions in these countries are investing in digital education infrastructure and mobile technologies to support gamified learning. This trend offers a significant opportunity to expand the reach of gamification in Southeast Asia and other developing regions.

However, factors like culture, technology access, and educational policies influence the rate at which gamification is adopted across different countries. In some regions, more traditional educational cultures may resist change or adopt new methods like gamification. Moreover, limited access to technological devices in some developing countries remains a significant barrier. Nevertheless, more inclusive educational policies and investments in technology could accelerate the equitable adoption of gamification worldwide.

Gamification positively impacts student engagement, motivation, and learning outcomes in language learning. Game elements like points, levels, leaderboards, and rewards encourage students to participate more actively in the learning process, creating a more interactive learning experience. In language learning, gamification allows students to learn more enjoyably and competitively, which helps boost their motivation. Research shows that students involved in gamified learning environments tend to be more motivated to complete learning tasks, directly impacting their language acquisition (Boudadi & Gutiérrez-Colón, 2020; Fitria, 2023).

Gamification is particularly effective in some

aspects of language learning, especially in teaching vocabulary and grammar. These skills often require repetitive practice, and game-based approaches make this process more engaging for students. Game elements like daily challenges and rewards incentivize students to keep practicing. The use of applications like Duolingo and Kahoot!, which incorporate gamification elements into the learning process, has proven effective in enhancing students' ability to master vocabulary and grammar (Adrefiza, 2022; Huseinović, 2023; Lee & Baek, 2023).

However, gamification may not have the same level of impact on all aspects of language learning. Speaking and communication abilities might not benefit as much from gamified vocabulary and grammar teaching approaches. Speaking practice requires direct interaction and contextual feedback, which can be challenging to achieve through computer-based gamification platforms. Therefore, gamification in language-speaking instruction is more effective when combined with other teaching methods, such as speaking simulations or group discussions, allowing human interaction.

Gamification positively impacts language learning, particularly in improving student motivation and engagement. While it is effective in certain areas like vocabulary and grammar, integration with other teaching methods may be necessary to achieve optimal results in developing speaking and communication skills. Gamification offers a flexible learning approach, allowing students to learn at their own pace while receiving instant feedback.

Despite the significant increase in research on gamification in language learning, several research gaps remain to be addressed. One underexplored area is the application of gamification in developing countries with limited technological infrastructure. Most existing research focuses on developed countries like U.S. and Western Europe, where access to technology and digital education infrastructure is relatively better. Further research is needed to understand how gamification can be applied in educational environments with limited access to technology.

Additionally, the long-term effects of gamification on language learning are still poorly understood. Most existing research focuses on short-term outcomes, such as increased student motivation and engagement over a short period. However, few studies evaluate the long-term impact of gamification on language skill retention. It is essential to understand whether the motivation and engagement generated by gamification can be sustained after students complete the learning program and how gamification can support ongoing learning.

Apart from technological limitations, preferences for traditional learning methods also pose challenges to gamification adoption. In some countries, educational institutions and teachers are more comfortable with established teaching methods, and the shift toward gamification may face resistance. Therefore, further research is required to explore the

best ways to integrate gamification with traditional learning methods. A more integrated approach can help overcome resistance and ensure that gamification is applied effectively in various educational contexts.

Another challenge to be addressed is access to technology, particularly in developing countries. While gamification has proven effective in enhancing learning outcomes, its implementation heavily relies on the availability of technological devices and adequate internet access. Future research should explore alternative solutions to overcome these barriers, such as developing gamification platforms that can be accessed without requiring strong internet connections or using more affordable technologies.

Global trends in gamification show that the application of this technology in language learning is increasingly growing, with significant contributions from both developed and developing countries. Gamification has proven effective in increasing student engagement and motivation, especially in teaching vocabulary and grammar. However, several research gaps need to be filled, including the lack of studies on the long-term effects of gamification and its application in countries with limited access to technology. Further research is necessary to understand how gamification can be integrated with traditional learning methods to be applied more widely and effectively in various educational contexts.

CONCLUSIONS

The research highlights the significant global growth of gamification research in language learning over the past two decades (2000–2024), with a sharp increase in publications between 2015 and 2020 driven by advancements in digital platforms. Bibliometric analysis identifies countries such as the U.S., Spain, Indonesia, and Malaysia as major contributors to this trend, reflecting widespread adoption of gamification across diverse cultural and educational contexts. The analysis also identifies influential researchers and institutions, including The University of Hong Kong, Universiti Kebangsaan Malaysia, and National Taiwan Normal University, as well as key scholars such as Chu SKW, Kitsnik M, and Soboleva EV, whose contributions have significantly shaped the discourse on gamification in language learning.

Gamification has proven effective in enhancing motivation, engagement, and learning outcomes, particularly in vocabulary and grammar instruction. Bibliometric analyses frequently associate it with keywords like ‘motivation’, ‘engagement’, and ‘learning outcomes.’ However, its impact on speaking skills and communication remains underexplored, highlighting the need for further research.

Additionally, the adoption of gamification is influenced by cultural, technological, and policy factors, suggesting that localized approaches are essential for effective implementation. Future research should investigate the use of gamification in advanced

language skills, such as speaking and communication, particularly in regions with limited technology, to promote broader inclusivity. Practical implications include leveraging gamification for repetitive tasks, supporting teacher training, and promoting equitable access to technology to maximize its potential in language education.

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