



BIBLIOMETRIC ANALYSIS OF DIGITAL GAME- BASED LEARNING IN LANGUAGE EDUCATION: A SYSTEMATIC LITERATURE REVIEW

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ABSTRACT. This systematic literature review (SLR) examines digital game-based learning (DGBL) in language education, focusing on trends, challenges, and opportunities in the field. A bibliometric analysis was conducted on 63 peer-reviewed articles published after 2019, selected through a structured search in the Scopus database. Studies were included based on predefined criteria, requiring a focus on DGBL in language education, empirical data, and publication in English-language peer-reviewed journals or conference proceedings. The review identifies key contributors, influential publications, and common research themes within the DGBL landscape. Findings suggest that DGBL offers promising outcomes in student engagement, motivation, and language learning, particularly in vocabulary acquisition and communication skills. However, challenges such as insufficient technological infrastructure, limited teacher training, and misalignment with curriculum objectives affect its implementation. The review highlights areas requiring further research, including longitudinal studies on its long-term impact, the development of personalized game-based learning experiences, and a stronger focus on teacher integration strategies. While DGBL presents valuable opportunities for language education, its effectiveness depends

on sustained investment in professional development, infrastructure, and interdisciplinary collaboration.

INTRODUCTION

Digital Game-based Learning (DGBL) refers to the use of digital gameplay elements and principles within educational contexts to enhance student engagement, motivation, and learning outcomes (Corti, 2006). By integrating interactive and often immersive experiences, DGBL leverages the intrinsic motivation and enjoyment found in games to support and reinforce educational objectives (Connolly et al., 2012). Over recent years, the application of DGBL has expanded across various educational levels and subjects, driven by technological advancements and a growing recognition of its potential benefits (Hierro & Seller, 2020; Mohamad et al., 2019; Vasbieva & Kalugina, 2024). This method has been especially impactful in language education, where immersive and interactive games can provide authentic language use scenarios, encouraging learners to practice communication, vocabulary, and grammar in meaningful ways (Putikadyanto et al., 2022).

The challenges associated with implementing DGBL in educational settings, despite its growing popularity, are well-documented in recent research. Key barriers include the need for well-designed educational games, sufficient technological infrastructure, and comprehensive teacher training. For instance, teachers often face difficulties integrating DGBL due to limited access to resources like up-to-date equipment and suitable digital learning materials, as well as a lack of professional development opportunities to effectively use these tools in the classroom (Kaimara et al., 2021; Nieland et al., 2021). Moreover, research highlights that while games can enhance engagement, their educational impact is closely tied to how well they are aligned with curriculum goals and the teacher's ability to integrate them into instruction (Kaimara et al., 2021). These challenges underscore the importance of ongoing research and investment in teacher training, resource allocation, and curriculum integration to fully realize the potential of DGBL in education.

With the rapid expansion of DGBL, this study aims to provide a comprehensive bibliometric analysis, focusing on the major research trends and contributions in this area. In this context, bibliometric analysis offers a more structured and objective approach by utilizing quantitative techniques to map research trends, key contributors, and intellectual structures within a field. This method allows for a broader, data-driven perspective on the development of DGBL in language education, revealing publication trends, influential studies, and collaborative networks that may be overlooked in conventional reviews. By leveraging bibliometric tools such as citation analysis and keyword mapping, this

study provides a systematic visualization of the evolving research landscape, offering insights into the intellectual foundation and emerging directions of DGBL. Such an approach is particularly valuable in rapidly growing interdisciplinary fields, where capturing the breadth and interconnectedness of research is essential for understanding its progression and informing future investigations (Passas, 2024). Specifically, this systematic literature review (SLR) seeks to answer the following key research questions:

- 1) How are studies regarding DGBL in language education distributed, and what are the most frequently cited?
- 2) What are the most commonly used keywords and key themes of research in the field of DGBL in language education?
- 3) Which countries and journals have made the most significant contributions to research regarding DGBL in language education?
- 4) What are the current trends and challenges of the research landscape of DGBL in language education?

By addressing these questions, the review aims to offer valuable insights into the development and dissemination of DGBLL, as well as highlight areas where further research and implementation efforts are needed. This bibliometric approach provides a clearer understanding of the academic landscape and the pivotal works shaping this evolving field.

METHODOLOGY

Search Procedures

The Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) 2009 framework was employed to ensure a comprehensive and transparent review process (Moher et al., 2009). The PRISMA 2009 framework was selected due to its widespread adoption and suitability for bibliometric and systematic reviews. This study systematically searched the Elsevier Scopus database, which was selected for its extensive coverage of peer-reviewed literature in the social sciences and arts disciplines. The search strategy focused on the keywords “digital game-based learning” AND “language education” to capture the full scope of relevant literature.

The PRISMA process was divided into four main stages: (a). Identification: The search was conducted using keyword combinations to locate studies relevant to the research questions. Filters were applied to restrict the results to publications in English and to the document types “article” and “conference paper”; (b). Screening: The initial search results were screened based on titles and abstracts. Studies that did not align with the scope of digital game-based language learning were excluded at this stage; (c). Eligibility: The full texts of the remaining studies were reviewed for relevance. Studies were excluded if they did not provide empirical data, focus on DGBL, or contribute to answering the research questions; (d). Inclusion: The final set of 63 studies that met all the inclusion

criteria were included in the bibliometric analysis and systematic review. This method ensures a rigorous and systematic review of the literature, enabling the identification of key trends, keywords, and contributions in the field of DGBL.

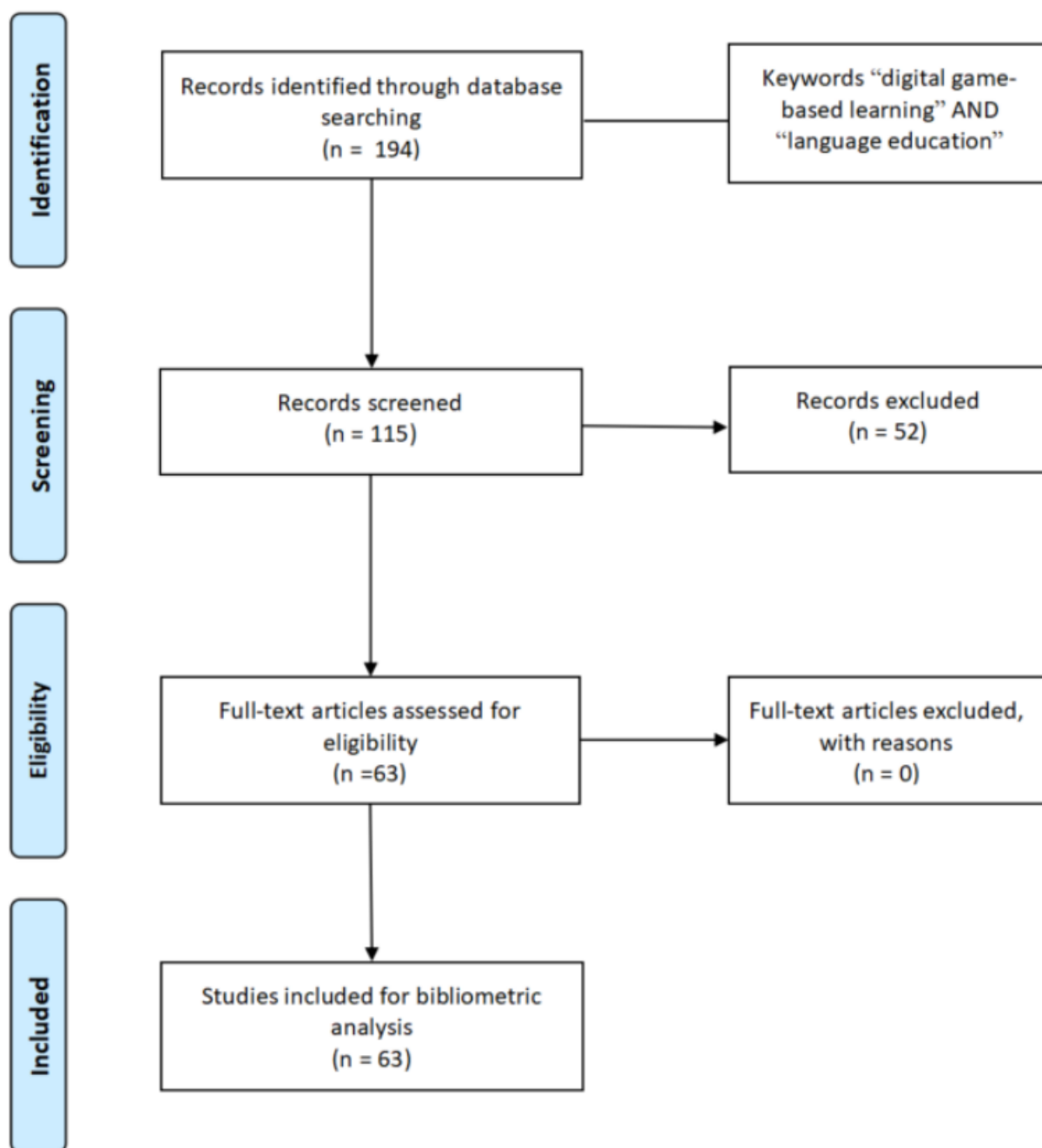


Fig. 1 PRISMA 2009 Flow Diagram for Literature Selection
Inclusion and Exclusion Criteria

The inclusion criteria were specifically designed to focus on recent studies (published post-2019) to capture the latest research trends and developments in the field of DGBL. The Scopus database was selected for its extensive coverage of peer-reviewed literature, and the search was limited to English-language publications. Studies were required to focus on the sub-areas of language learning and DGBL to ensure alignment with the research objectives. To be included in this review, the studies had to meet the following criteria:

- 1) Language: The study was published in English.
- 2) Time Period: Only studies published after 2019 were included.
- 3) Journal and Conference Proceedings: The study must have been peer-reviewed.
- 4) Document Types: Lecturer notes, unpublished articles, dissertations and theses were excluded.
- 5) Focus: The study must focus on the impact of DGBL and language education, excluding research that only discussed digital games in general without application to language learning.
- 6) Game Definition: The digital game used in the study must meet the specific definition of game-based learning, emphasizing its role as a learning tool.

The exclusion criteria involved eliminating studies that:

- 1) Did not provide empirical data on the impact of DGBL on language learning.
- 2) Were not peer-reviewed, such as editorials or opinion pieces.
- 3) Investigated general digital games without focusing on their educational applications.

To be specific, the search strings used in this review was “TITLE-ABS-KEY (digital AND game-based AND learning AND language AND education) AND PUBYEAR > 2018 AND PUBYEAR < 2025 AND (LIMIT-TO (SUBJAREA , "SOC") OR LIMIT-TO (SUBJAREA , "ARTS")) AND (LIMIT-TO (DOCTYPE , "ar") OR LIMIT-TO (DOCTYPE , "cp")) AND (LIMIT-TO (LANGUAGE , "English"))”. This approach ensured a focused and high-quality set of studies, facilitating a comprehensive analysis of the latest research trends and contributions to DGBL in language education.

Data Extraction Method

For this review, a bibliometric analysis approach (Passas, 2024) was applied to systematically analyze the selected literature. The following steps outline the data extraction and bibliometric analysis process: (a). Data Extraction: Key metadata, such as author names, publication year, journal titles, countries of origin, and citation counts, were extracted from each article. This information was used to identify research trends and influential contributions within the field of DGBL in language education. (b). Keyword Analysis: A frequency analysis of the most commonly used keywords was performed to identify recurring themes and topics of interest in DGBL in language education research. To ensure accuracy, a combination of manual verification and automated text-processing methods was applied. Initially, Microsoft Excel’s COUNTIF function was used to count the occurrences of each keyword, followed by a secondary check using Natural Language Toolkit (NLTK), a Python-based text analysis tool to validate the results and account for variations in term usage. Identical terms were consolidated to avoid redundancy, and thematic categorization was applied to group related terms under broader research areas. This analysis helps reveal the central focus areas and research directions over the past 5 years. (c). Citation Analysis: The

citation counts for each article were used to determine the most influential studies in the field. Highly cited works were analyzed to understand their contributions to the advancement of DGBL. (d). Geographical Distribution: The countries and institutions contributing to DGBL in language education research were analyzed to understand the global landscape of research contributions and collaborations. (e). Journal and Conference Impact: The analysis also examined which journals and conferences were most prominent in publishing DGBL studies, providing insights into the platforms shaping this field.

The bibliometric analysis in this SLR was conducted using VOSviewer 1.6.20, a tool designed to extract bibliometric data and visualize it in the form of network maps. The analysis included generating tables and network maps to identify the most cited papers, frequently used keywords, and the most influential countries, institutions, and journals contributing to the field of DGBL in language education. VOSviewer facilitated the creation of graphical representations of these relationships, allowing for an interactive exploration of the data.

This method of analysis extends beyond merely defining key factors; it also provides descriptive insights into how these elements interconnect within the field. By utilizing this approach, researchers can better evaluate the scope of the scientific literature, understand influential trends, and maximize the utility of their research findings. The resulting bibliometric data were structured into descriptive tables, followed by a visual mapping to showcase the interconnectedness of the research landscape.

RESULTS

Document and Citation Distribution

In answering Research Question 1: “How are studies on the use of DGBL in language education distributed and what are the most frequently cited?”, the analysis clearly illustrates the annual publication trends from 2019 to 2024.

Document Distribution by Year

The frequency analysis of the publication years, as illustrated in Fig. 2, reveals a fluctuating trend in the number of studies on DGBL in language education from 2019 to 2024. Specifically, the distribution is as follows.

The analysis of the Scopus database shows a general increase in publications from 2019 to 2023, underscoring the growing academic interest in DGBL within the realm of language education. This data points to a growing interest in the field, particularly notable in a significant increase in 2023, followed by a slight decrease in 2024, which may be attributed to incomplete data for the year. The trend reflects the evolving nature of DGBL applications in language education, capturing both academic and practical interests as new technologies and methodologies emerge. This distribution is graphically represented in the trend line, which exhibits a peak in 2023, suggesting a heightened collective focus and

possibly key publications or breakthroughs in that year, driving further research and publication in this domain.

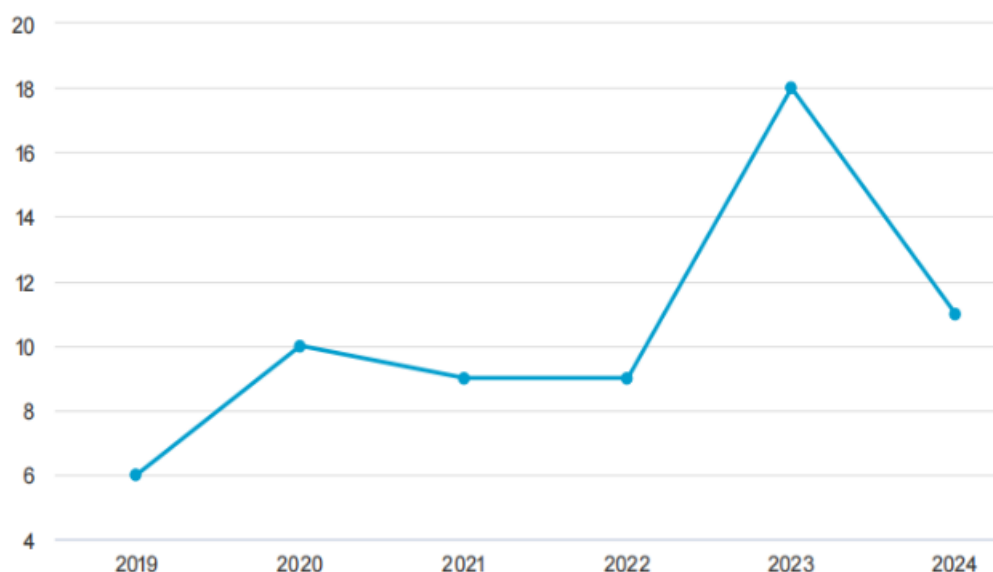


Fig. 2 Records distribution over the years

Most Frequently Cited Studies

The below table is a general overview of the findings from the top 10 most highly cited articles on DGBL in language education. These articles emphasize the positive impact of game-based approaches in language learning, highlighting common themes, benefits, and insights.

No.	Author (Year)	Title	Source	Total citations
1	Yang et al. (2020)	Balancing cognitive complexity and gaming level: Effects of a cognitive complexity-based competition game on EFL students' English vocabulary learning performance, anxiety and behaviors	Computers and Education	116
2	Lee (2022)	Problem-based gaming via an augmented reality mobile game and a printed game in foreign language education	Education and Information Technologies	61
3	Lin <u>et al.</u> (2020)	Facilitating EFL students' English grammar learning performance and behaviors: A contextual gaming	Computers and Education	51

No.	Author (Year)	Title	Source	Total citations
		approach		
4	Blume (2020)	Games people (don't) play: An analysis of <u>pre-service</u> EFL teachers' behaviors and beliefs regarding digital game-based language learning	Computer Assisted Language Learning	49
5	Martinez et al (2022)	Entertainment Video Games for Academic Learning: A Systematic Review	Journal of Educational Computing Research	48
6	Taskiran (2019)	The effect of augmented reality games on English as foreign language motivation	E-Learning and Digital Media	47
7	Fithriani (2021)	The utilization of mobile-assisted <u>gamification</u> for vocabulary learning: Its efficacy and perceived benefits	CALL-EJ	37
8	Govender and Arnedo-Moreno (2021)	An analysis of game design elements used in digital game-based language learning	Sustainability (Switzerland)	30
9	<u>Alawadhi</u> and <u>Abu-Ayyash</u> (2021)	Students' perceptions of <u>Kahoot!</u> : An exploratory mixed-method study in EFL undergraduate classrooms in the UAE	Education and Information Technologies	29
10	Cárdenas-Moncada et al. (2020)	Game-based student response systems: The impact of <u>Kahoot</u> in a <u>chilean</u> vocational higher education EFL classroom	CALL-EJ	28

Table 1. Top-10 highly cited articles
Citation Analysis by Year

The citation analysis reveals an interesting pattern in how these publications have influenced subsequent research. The number of citations each year highlights the ongoing relevance and foundational role of earlier research in shaping current studies. The citation details, indicative of the scholarly impact and engagement, are as follows (Fig. 3).

The peak in citations in 2021 indicates a significant year for impactful research in DGBL within language education. This could be attributed to key publications from previous years gaining recognition and utilization within the academic community. The decline in citations post-2021 could suggest a maturing field where new innovations are possibly needed to spur further engagement, or it

might reflect the typical delay in accumulating citations for more recent publications.

This pattern suggests that while the field saw the most substantial impact in terms of citations in 2021, there is a noticeable variability in how quickly studies are recognized and cited in subsequent years, indicating the dynamic nature of research interests and the evolving focus of academic investigations within this area.

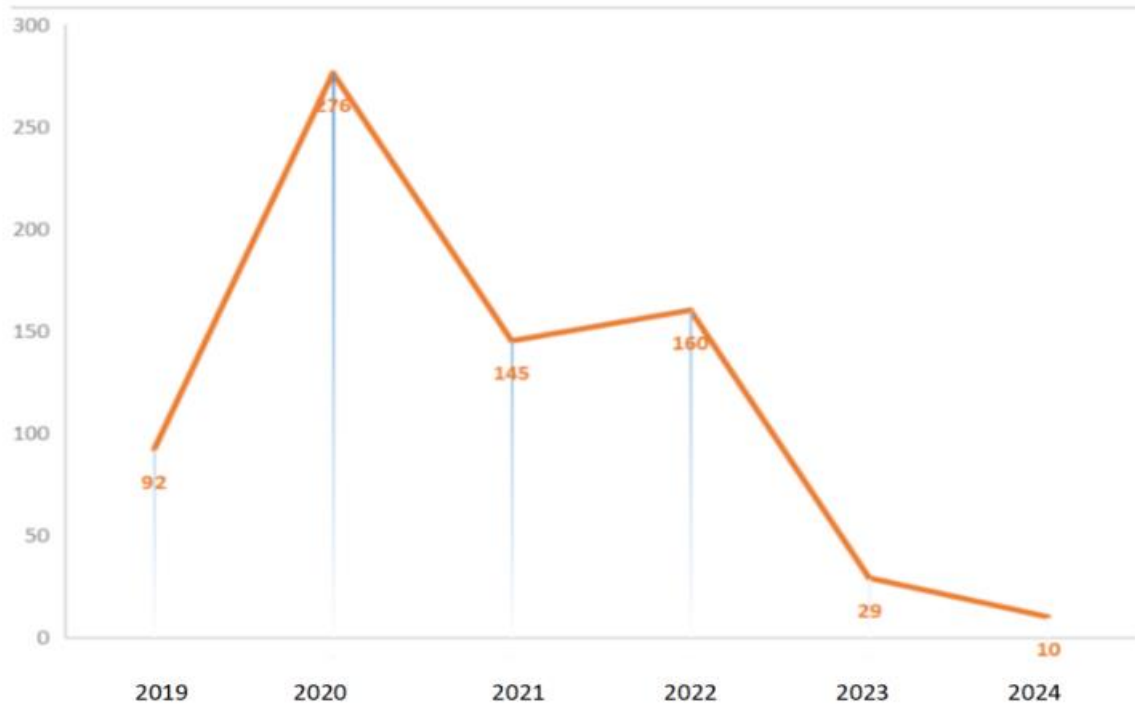


Fig. 3 Citation by year

Network Map of Citation

The citation network map (Fig. 4) created using VOSviewer provides a comprehensive visual representation of the interconnectedness of research within the field of DGBL in language education. This analysis is crucial in identifying key documents, influential researchers, and emergent themes in the domain.

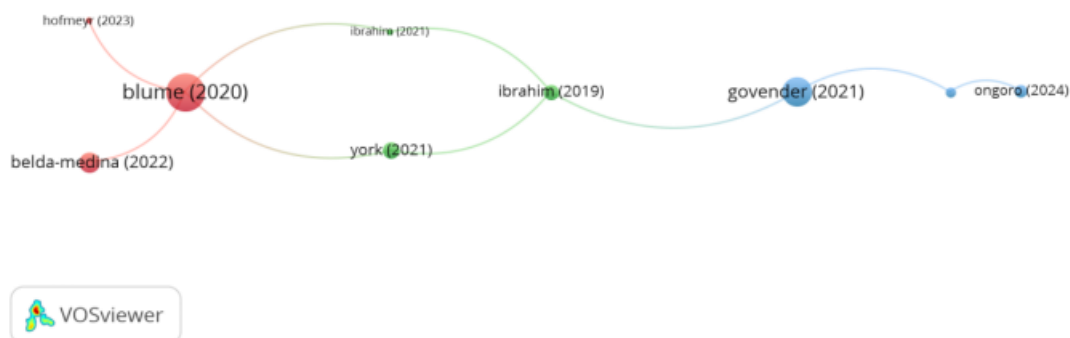


Fig. 4: Network map of citation

Central Nodes. Blume (2020) emerges as a pivotal document within the network, illustrated by its central placement and larger node size. This indicates

that Blume's work has been extensively cited by peers and significantly cites other research, suggesting it offers fundamental insights and methodologies to subsequent studies. Other notable central nodes include Hofmeyr (2023) and Belda-Medina & Calvo-Ferrer (2022), which are closely connected to Blume (2020), indicating thematic and methodological similarities.

Cluster Analysis. The network map is distinctly segmented into three primary clusters, each representing a different research focus within the DGBL landscape: (a). Red cluster encompasses foundational and broadly influential works, centralizing around Blume (2020). This cluster indicates a well-established area of research focusing on core concepts and practices in DGBL that have shaped the field. (b). Green cluster includes works such as Ibrahim (2019) and Ibrahim (2021), signifying a continuation and evolution of specific educational theories and digital implementation strategies within language learning. (3). Blue cluster highlights by newer entries such as Govender & Arnedo-Moreno (2021) and Ongoro & Fanjiang (2024), representing emerging trends and innovative approaches that diverge from and build upon the established methodologies captured in the other clusters.

Inter-cluster Connections. Inter-cluster connections, such as those linking Blume (2020) with Ibrahim (2019), illustrate the interdisciplinary nature of research in DGBL. These links are indicative of the cohesive nature of research in this field, where different thematic areas still draw significantly from each other, supporting a dynamic and integrated academic community.

Temporal Dynamics. The distribution of documents from 2019 to 2024 highlights the evolution and sustained interest in DGBL research. Notably, the ongoing citation of earlier works such as Ibrahim (2019) by publications in 2021 and beyond reflects the lasting impact of foundational research within the field.

The citation network analysis underscores the complexity and vibrancy of the academic dialogue within DGBL. By mapping out the relationships between key publications, this review not only highlights the influential works but also traces the thematic and methodological evolution of the field, offering a structured overview that supports both current researchers and informs future studies.

Keywords and Themes

To answer research question 2 "What are the most commonly used keywords of research in the field of DGBL in language education? And what are the key themes?" The network map of keywords (Fig. 5) highlights frequent keywords and research themes within DGBL and their connections in the context of language education.

Network Map of Keywords

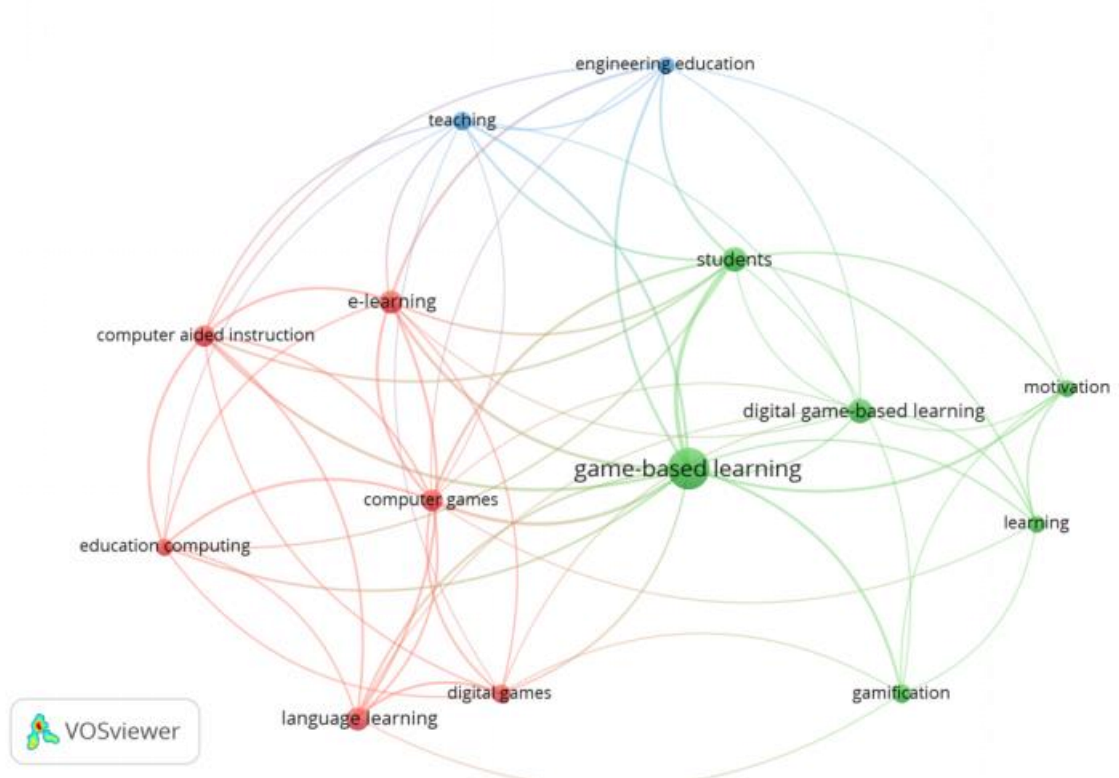


Fig. 5: Network map of keywords

At the center of the map, “game-based learning” serves as the primary focus, closely linked to “students,” “digital game-based learning,” “learning,” and “motivation.” This central placement underscores the role of game-based learning as a critical theme in the literature, especially concerning student engagement and learning outcomes.

The cluster around “digital games” and “computer games” shows that much of the research is closely tied to exploring the use of digital platforms and computer games as educational tools. This cluster is connected to “language learning” and “education computing,” suggesting a focus on technology-enhanced learning environments. Another important connection is the link between “motivation” and “learning” through DGBL. This signifies that enhancing motivation is a major goal of integrating game-based learning, with the aim of improving learning outcomes.

Subfields and Technologies. “E-learning” and “computer-aided instruction” are linked, reflecting studies that focus on DGBL as part of broader digital or computer-assisted instructional methods. “Engineering education” and “teaching” reflect areas where DGBL is being integrated beyond just language learning, suggesting a wider application of game-based learning methodologies in different educational fields.

The color-coded clusters indicate several research directions: (a). The red cluster focuses on technology, including “computer games,” “e-learning,” “education computing,” and “computer-aided instruction,” showing a strong connection between technological tools and educational strategies. (b). The green cluster centers around pedagogical approaches and learner outcomes, with

keywords such as “game-based learning,” “students,” “motivation,” and “learning.”. The blue cluster is more specialized, connecting “teaching” and “engineering education,” highlighting how DGBL is used in technical or STEM-related fields.

This network map effectively illustrates the multifaceted nature of research in digital game-based learning, highlighting the strong focus on student engagement, motivation, and the integration of digital tools into education. The interconnected keywords suggest that while DGBL is primarily applied in language learning, it also overlaps with broader educational technologies and methodologies. This map serves as a visual representation of the academic community’s evolving interests, showing both foundational concepts and emerging trends within DGBL research.

Key Themes

Themes	Keywords	Frequencies
Digital Game-Based Learning	digital game-based learning; game-based learning; digital games; serious games; game design; game mechanics; AR games; mobile games; gamification	74
Educational Technology and Innovation	technology enhanced learning; learning management systems; e-learning; technology integration; Innovation; educational technology; mobile learning	17
Language Acquisition and Learning	language learning; language skills; language acquisition; vocabulary learning; second language acquisition; language education; mobile-assisted language learning	15
Motivation and Engagement	intrinsic motivation; engagement; motivation; perception	13
Assessment and Feedback	student response systems; real-time feedback; assessment; formative feedback	8

Table 2. Key Themes Analysis

The keyword frequency analysis and thematic categorization reveal key trends in DGBL research within the context of language education. Five primary themes emerge from this analysis: Digital Game-Based Learning, Educational Technology and Innovation, Language Acquisition and Learning, Motivation and Engagement, and Assessment and Feedback. These themes highlight the central focuses and research directions that characterize the current landscape of DGBL in language education.

Digital Game-Based Learning is the most frequently referenced theme, with keywords such as “digital game-based learning,” “game-based learning,” and “digital games” dominating the dataset. This prominence suggests a substantial

scholarly focus on integrating digital games as a core instructional tool for language learning. Researchers are not only exploring the general utility of DGBL but are also delving into specific game elements, such as “game mechanics” and “game design,” that contribute to effective learning experiences. The inclusion of terms “serious games” and “AR games” further indicates an interest in specialized types of games that provide educational value beyond mere entertainment. This theme reflects a concerted effort to investigate how structured digital games can be optimized for educational purposes, particularly within the language learning domain.

The second major theme, Educational Technology and Innovation, underscores the role of digital innovation in enhancing language learning experiences. Keywords such as “technology-enhanced learning,” “e-learning,” and “technology integration” suggest that DGBL is being examined as part of a broader push toward digital transformation in education. The presence of terms “mobile learning” and “learning management systems” indicates that researchers are exploring how various technological platforms can support the scalability and accessibility of game-based learning methods. This theme highlights the potential of technological advancements to redefine traditional language instruction, making it more dynamic and adaptable to modern learners' needs.

Language Acquisition and Learning is another prominent theme, with keywords including “language learning,” “vocabulary learning,” and “language acquisition.” This focus demonstrates the core educational objective of DGBL within language contexts—facilitating language proficiency and skill development. Research in this area appears to concentrate on how game-based methods can support specific aspects of language acquisition, such as vocabulary development and the acquisition of foundational language skills. The inclusion of “mobile-assisted language learning” as a keyword suggests that mobile devices are viewed as valuable tools for promoting language learning due to their flexibility and ease of access, enabling learners to engage in language practice anytime and anywhere.

Motivation and Engagement represents a significant psychological dimension of DGBL, with terms “motivation,” “engagement,” and “intrinsic motivation” frequently cited. This theme points to the perceived motivational benefits of game-based learning environments. Scholars argue that the interactive nature of digital games fosters greater student engagement, making language learning a more enjoyable and immersive experience. The emphasis on motivation suggests that DGBL is seen as a potential solution to some of the motivational challenges associated with traditional language instruction, with game elements designed to sustain learners' interest and enthusiasm over time.

Finally, the theme of Assessment and Feedback emerges as a critical component of DGBL research. Keywords such as “student response systems,” “real-time feedback,” and “formative feedback” reflect a focus on how assessment practices are integrated within game-based learning environments.

Real-time feedback, in particular, is highly valued in DGBL, as it allows learners to receive immediate insights into their performance, thereby reinforcing correct responses and enabling timely corrections. This theme highlights the importance of responsive feedback mechanisms in maintaining learner engagement and supporting skill acquisition, aligning with the interactive and adaptive nature of game-based learning.

The thematic analysis of keywords in DGBL research within language education reveals a multi-faceted approach that prioritizes learner engagement, technological innovation, and effective assessment. Together, these themes suggest that DGBL holds considerable promise for enhancing language acquisition by leveraging interactive, technology-enhanced, and learner-centered methods. The findings indicate a growing scholarly interest in DGBL as a transformative approach to language education, one that seeks to address traditional pedagogical limitations through motivation-driven, responsive, and innovative learning experiences. This analysis underscores the potential of DGBL to reshape language education in the digital age, making it more aligned with contemporary learners' needs and expectations.

Most Influential Countries and Sources

Most Influential Countries

Based on the data presented in the bar chart (Fig. 6), China emerges as the most influential contributor in the field of DGBL in language education, with a total of 8 contributions. This indicates that China is at the forefront of advancing research and practical applications in this area, showing strong academic interest in using game-based approaches to enhance language education outcomes.

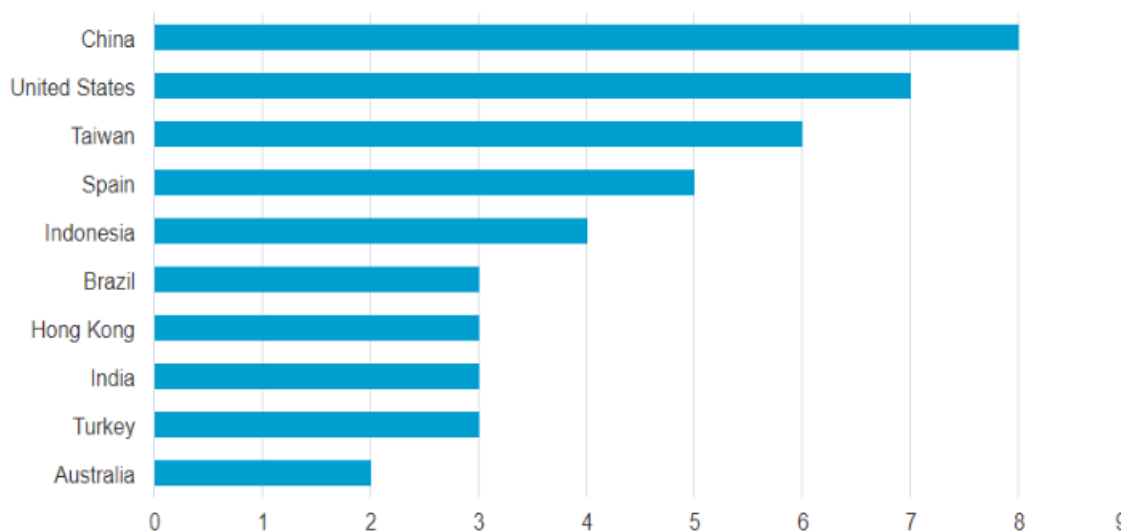


Fig. 6 Most influential countries

Following closely behind, the United States ranks second with 7 contributions, highlighting its significant role in driving innovation and scholarly activity in this field. As a global leader in educational technology, the U.S. continues to play a pivotal role in exploring the potential of DGBL for language learning.

Taiwan and Spain are both key contributors, with 5 contributions each. Taiwan, as a region with a strong tradition of integrating technology into education, has made important advances in DGBL research, particularly in the context of language learning. Similarly, Spain's contributions reflect a growing European interest in gamification and digital tools for educational purposes, emphasizing how game-based learning can transform traditional language teaching methods.

Indonesia follows with 4 contributions, indicating a growing focus on educational technology within Southeast Asia. Indonesia's increasing involvement in DGBL research points to its efforts to modernize language education through the adoption of digital games as interactive learning tools.

Other notable contributors include Brazil, Hong Kong, India, and Turkey, each with 3 contributions. These regions represent a diverse global perspective on the integration of DGBL into language education. Brazil and India, with their large populations and ongoing educational reforms, show a commitment to exploring innovative learning strategies. Hong Kong, as a region with a dynamic educational system, and Turkey, with its emphasis on integrating digital tools into education, also highlight the expanding global interest in this field.

Finally, Australia rounds out the list with 2 contributions, underscoring its involvement in advancing digital tools for educational purposes, despite having fewer contributions compared to the leading regions. Overall, these contributors reflect the widespread and growing global attention on the potential of digital game-based learning to enhance language education across diverse educational contexts.

Most Influential Journals

Based on the below line graphs (Fig.7), the following report outlines the most influential journals and document distribution per year by sources for DGBL in language education.

Most Influential Journals. (a). Education and Information Technologies shows an increase in document contributions over the years. Starting from 1 document per year from 2020 to 2022, it rises to 3 documents in 2024. This trend indicates a growing interest in how educational technologies are being used in language learning. (b). CALL EJ (Computer-Assisted Language Learning Electronic Journal) stands out with 4 documents, maintaining a steady presence with 1 document per year from 2019 to 2023. This journal is prominent in the DGBL research area, particularly focusing on how computer-assisted language learning tools, including digital games, are used to enhance language education. (c). British Journal of Educational Technology has 2 documents, one published in 2021, another in 2024. It is influential in the broader field of educational technology and its applications in improving learning outcomes, including the use of games. (d). Computer Assisted Language Learning contributes 2 documents. These journals emphasize how computer technologies, including digital games, facilitate language learning and broader educational processes.

DISCUSSION

Current Trends of DGBL in Language Education

DGBL continues to gain prominence in language education, characterized by its focus on interactive, immersive, and technology-driven pedagogical methods. The effectiveness of DGBL in language education can be understood through several established theories. Self-Determination Theory (SDT) (Deci & Ryan, 1985) explains how games enhance motivation by fulfilling learners' needs for autonomy, competence, and relatedness, while Flow Theory (Csikszentmihalyi, 1990) highlights how an optimal balance of challenge and skill in games sustains engagement. Additionally, Constructivist Learning Theory (Vygotsky, 1978) supports the idea that games provide meaningful, contextualized interactions that reinforce language acquisition. Empirical studies align with these frameworks, showing that DGBL fosters vocabulary retention, reduces anxiety, and improves communication skills through interactive and immersive gameplay (Lin et al., 2020; Yang et al., 2020). Well-designed game mechanics—such as adaptive difficulty, real-time feedback, and social interaction—leverage these theories to create engaging and effective learning experiences, underscoring the pedagogical value of DGBL in language education.

A notable trend is the increased use of mobile-based platforms and augmented reality (AR) technologies, which make learning more engaging and accessible. Studies such as Kim et al. (2023) highlight the success of mobile-assisted games in addressing specific learning needs, such as improving vocabulary acquisition and fostering communication skills among young learners. This reflects a broader movement toward leveraging mobile and AR technologies to provide flexible and contextually relevant language learning experiences. The findings align with broader trends in bibliometric analyses, such as those by Kushairi and Ahmi (2021), who utilized Lotka's law to predict sustainable contributions and networking in educational pedagogies, further emphasizing the value of structured approaches to assess research impact within domains of flipped classrooms and DGBL in language education.

Another emerging direction is the integration of serious games tailored to enhance specific language competencies. Research by Shakhmalova and Zotova (2023) and Tadiboyina et al. (2024) underscores the potential of games designed with cognitive complexity and real-time feedback mechanisms to support grammar acquisition and technical language proficiency. Such games promote active learning and encourage learners to apply language skills in simulated real-world contexts.

The thematic expansion of DGBL research also includes efforts to address diverse learner profiles. For example, Cárdenas-Moncada et al. (2020) explore how gamified student response systems, such as Kahoot!, enhance engagement and foster collaborative learning in vocational and higher education settings. Similarly, the work of Lin et al. (2020) demonstrates how contextual gaming

approaches cater to varied linguistic and cultural needs, ensuring inclusivity in language education.

Additionally, the pedagogical focus of DGBL is shifting toward promoting critical thinking and problem-solving skills alongside language proficiency. Lee (2022) exemplifies this trend through problem-based gaming methods that combine AR with traditional printed games to create hybrid learning environments. This approach not only aids in language development but also nurtures cognitive and collaborative abilities essential for 21st-century learners.

The role of adaptive learning technologies is also gaining attention. Research highlights the value of games that adjust to individual learner needs and provide personalized experiences. For instance, the study by Yang et al. (2020) reveals how balancing gaming difficulty with cognitive demands can mitigate anxiety and optimize language learning outcomes. This aligns with the broader educational trend of harnessing artificial intelligence (AI) and data-driven strategies to enhance learner engagement and retention.

Finally, the geographical diversification of DGBL research reflects its global relevance. Contributions from regions like China, the United States, and Spain demonstrate significant advancements in the field, while emerging research from Southeast Asia and Latin America, as noted by Ongoro & Fanjiang (2023), highlights the increasing adoption of DGBL in multilingual and under-resourced educational contexts. This global perspective enriches the field, showcasing innovative practices tailored to local educational challenges and opportunities.

Issues and Challenges in Implementing DGBL

Despite its growing adoption and demonstrated effectiveness, the implementation of DGBL in language education faces several notable challenges. These barriers span technological, pedagogical, and contextual dimensions, complicating its broader integration into educational systems.

Technological Infrastructure

One of the most frequently cited challenges is the lack of adequate technological infrastructure, particularly in resource-constrained environments. Jenson and de Castell (2023) underscore the disparity in access to reliable internet, up-to-date devices, and educational software, which limits the feasibility of DGBL in many schools. Similarly, studies by Pitarch (2024) and Al-Harbi & Madini (2024) highlight the significant role of institutional support in providing the necessary technological foundations. Without such support, DGBL's potential remains untapped in underserved educational settings.

Teacher Preparedness and Professional Development

Another critical barrier is the insufficient training provided to educators in effectively incorporating game-based tools into their teaching. As Dashtestani (2022) and Lin et al. (2020) observe, many teachers lack the confidence and technical skills required to use DGBL effectively. This challenge is compounded by a shortage of professional development opportunities tailored to integrating DGBL into curriculum objectives. The reluctance of educators to adopt DGBL

often stems from a lack of understanding about its pedagogical value and practical implementation strategies, leading to underutilization of these innovative tools.

Alignment with Curriculum Goals

The misalignment of digital games with established curriculum objectives poses a further challenge. Yang et al. (2020) point out that while games can enhance motivation and engagement, their educational impact is diminished if they fail to align with curricular requirements. This misalignment often results in games being perceived as supplemental activities rather than integral components of the learning process. Effective curriculum design is necessary to ensure that DGBL complements existing learning outcomes rather than functioning in isolation.

Balancing Entertainment and Educational Value

DGBL's dual purpose of entertaining and educating learners can sometimes create tension between these objectives. If games prioritize entertainment over pedagogical value, as highlighted in Govender and Arnedo-Moreno's (2021) analysis of game design elements, the educational impact may be undermined. Striking a balance between engaging gameplay and meaningful learning outcomes requires careful attention to game mechanics and educational content.

Main Research Gaps

Despite the growing body of research on DGBL in language education, several critical gaps remain unaddressed. These research gaps highlight opportunities for future investigations to enhance the effectiveness and accessibility of DGBL across diverse educational contexts.

Longitudinal Impact Studies

A major limitation in existing research is the lack of longitudinal studies examining the sustained effects of DGBL on language proficiency. Most current studies, as noted by Yang et al. (2020) and Shakhmalova and Zotova (2023), focus on short-term improvements in vocabulary acquisition or engagement. However, there is a pressing need to understand how DGBL influences long-term retention, fluency, and overall language mastery. Longitudinal studies would provide insights into the durability of learning gains and the cumulative benefits of game-based interventions.

Personalized and Adaptive Learning Experiences

While personalization is a hallmark of effective digital learning tools, research on adaptive DGBL systems tailored to individual learner needs remains limited. As highlighted by Kim et al. (2023), adaptive games that dynamically adjust content difficulty and pacing based on learner performance can significantly enhance engagement and outcomes. Future studies should explore the integration of artificial intelligence (AI) and machine learning (ML) to develop personalized DGBL environments that accommodate diverse learning styles, proficiencies, and cultural backgrounds.

Teacher-Centered Perspectives

Research predominantly focuses on the student experience, with limited exploration of how educators perceive, adopt, and integrate DGBL into their teaching practices. Dashtestani (2022) emphasizes the need for studies examining the role of teachers as facilitators in DGBL settings, including their training needs, attitudes, and challenges. Investigating teacher-centered perspectives would help identify effective strategies for professional development and support, ensuring that educators are equipped to maximize the potential of DGBL.

Inclusion and Accessibility in DGBL

Existing research often overlooks the design and implementation of DGBL for learners with special educational needs or disabilities. Studies such as Ongoro & Fanjiang (2023) suggest that most digital games lack inclusive features, such as alternative input methods, audio descriptions, or culturally sensitive content. Further research should focus on creating universally accessible DGBL tools that cater to learners from diverse linguistic, physical, and socio-economic backgrounds, ensuring equitable access to game-based learning.

Evaluation of Learning Outcomes

There is a need for more rigorous methods to evaluate the educational impact of DGBL. Existing assessments, as noted by Lin et al. (2020), often rely on subjective measures such as self-reported motivation or perceived learning gains. Future research should prioritize the development of standardized metrics and experimental designs to objectively assess how DGBL influences language proficiency, critical thinking, and transferable skills.

CONCLUSION

This SLR highlights the growing significance of DGBL in language education, as evidenced by the increasing number of studies and contributions from diverse regions. DGBL has proven to be a powerful tool for enhancing student engagement, motivation, and learning outcomes, particularly in areas such as vocabulary acquisition and communication skills. The immersive and interactive nature of games allows learners to experience authentic language use scenarios, making learning both enjoyable and meaningful.

Despite these positive trends, several challenges remain in the implementation of DGBL. Issues such as insufficient technological infrastructure, inadequate teacher training, and misalignment with curriculum objectives often hinder the effective use of DGBL in classrooms. Addressing these challenges requires ongoing investment in teacher professional development and resources, as well as ensuring that digital games are properly aligned with educational goals.

This review also reveals key research gaps that need further exploration. There is a need for longitudinal studies to assess the long-term impact of DGBL, as well as research on how personalized game experiences can enhance learning. The role of teachers in the effective integration of DGBL and the use of these tools in multilingual and inclusive classrooms remain under-researched areas.

While this SLR provides valuable insights, it is important to note its limitations. The focus on the Scopus database and English-language studies may have excluded relevant research. Furthermore, the time frame of studies considered (post-2019) could have overlooked foundational contributions to the field. Future research should aim to expand the scope of databases and include diverse socio-cultural contexts to provide a more comprehensive understanding of DGBL's potential.

In conclusion, DGBL continues to evolve as a dynamic and influential approach in language education. For it to reach its full potential, further research and collaboration across disciplines are necessary to address the current gaps and challenges. By doing so, educators and researchers can ensure that DGBL becomes a more inclusive, effective, and sustainable tool for language learning worldwide.

1. American Pastoral, see Derek Parker Royal.

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