Incorporating Gamification in Second Language Learning: A Bibliometric Analysis

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Article Info	Abstract
	In the contemporary digital era, the utilization of gaming has emerged as a prevalent method for actively engaging students in the learning processes at various levels of academic curricula and within the broader educational community. This trend is particularly pronounced in English language teaching curricula, especially among learners whose mother tongue is not the English language. The judicious incorporation of gaming activities into courses pertaining to English as a second language (ESL) holds substantial promise for augmenting student learning, motivation, and knowledge acquisition across diverse disciplines. The present study conducts a bibliometric analysis focused on the utilization of gamification in ESL teaching and learning. The study's primary objective is to furnish a descriptive analysis of scholarly documents, authors, citations, and interconnections among authors. To achieve this objective, data extracted from the Scopus database are subjected to analysis. In addition to descriptive analyses, the extracted data undergo scrutiny using the VOSviewer software, facilitating the discernment of visual representations encompassing authors' interconnections, keywords connectedness and clusters indicative of research topics within the examined scholarly landscape. Using bibliometric analysis techniques, our investigation of the citation relationships among 61 publications has successfully identified two predominant themes influenced by gamification: language learning and student motivation. The discernible evidence of a rising number of publications focusing on gamification and ESL within the examined literature highlights the growing significance of this intersection. This study holds practical implications for serious game designers, English language educators, and educational institutions.

Introduction

Research on game-based educational tools has proliferated as a result of recent developments in technology-assisted learning trends. Educators use gamification all the time to improve their students' acquisition of knowledge and abilities in a variety of academic areas. Incorporating game dynamics and aspects into non-gaming contexts is known as gamification (Hsu and Chen, 2018; Huotari and Hamari, 2017). Gamification can also be understood as the use of game-based strategies to problem-solving in educational settings, with the goal of

boosting students' passion for learning (Adipat, 2021). Other phrases that are connected to this one are "game-inspired design," which incorporates ideas and concepts from games into the design of curricula without actually utilizing games. The effective integration of games into education requires a sufficient technological infrastructure as well as an instructional framework that can support gaming activities (Yamani et al., 2021).

Including game-based activities in instructional activities has several advantages. Lamrani and Abdelwahed, (2020) discovered a number of advantages of gamification for student learning in their investigation of serious games and digital game-based learning. Enhancement of digital literacy and cognitive development; improvement of sound decision-making and problem-solving abilities; development of soft skills; improved peer collaboration and communication; development of skills in a competitive setting; improvement of self-esteem; and reinforcement of learning progress through the use of feedback and reward systems found in well-made serious games were some of these. Another study of sustainable engineering courses, students and instructors discovered that offering workshops with gamification components greatly increased students' recollection of key ideas related to the subject (Clark et al., 2021). In addition, gamification also proven as a pedagogical tool that can enhance student motivation (Bovermann, et al., 2018). The underlying gaming activities need to have a strong educational foundation in order to be a successful teaching tool (Nah et al., 2013). Luo et al., (2022) state that the ultimate goal of gamification, as seen through the lens of design, is to influence human behavior in order to achieve predetermined goals, with the educational environment striving for a positive augmentation of student learning.

Many studies have investigated the idea that adding gamification components might significantly boost student learning across a range of domains, including teaching and learning English as a second language (ESL). According to Anngoro and Khasanah's (2024) systematic study, there are various advantages of integrating technology-infused gamification into English language learning. One such advantage is that it can boost motivation, which in turn yields better evaluation outcomes. Dehghanzadeh et al. (2021) carried out an extensive systematic evaluation with a particular focus on the ESL learning environment. To determine the major trends in this field of study, they examined 22 articles from 2008 to 2019. Their results show that gamification has a positive effect on learners' overall results and ESL learning experiences. Gamified language learning settings have been shown to be beneficial for improving ESL learners' vocabulary acquisition (Thiagarajah et al., 2022). Additionally, eight other publications support the use of game-based approaches to enhance students' mastery of English vocabulary, such as Hidayah et al (2024); Yudha et al, (2021) ; Ghazy et al, (2021); Nurchintyawati (2021); Idris et al.,(2020); Abdullah et al., (2022); Fauzi et al., (2022);Yen and Aziz, (2022), just to mention a few. These studies have not only shown improvements in vocabulary in English, but more significantly, they have demonstrated how gamification can have a revolutionary effect on the process of learning English as a second language (Mirzapour Kouhdasht, 2023).

The numerous other advantages of gamification in developing particular abilities necessary for learning English as a second language have been highlighted by recent studies. Notably, extensive review conducted by Deghanzadeh (2021) did a comprehensive literature review which notably shows that most of the research showed favorable benefits of gamification on learners' learning outcomes and experience. Because gamification is interactive and immersive, it immerses students in dynamic scenarios and offers context-rich experiences that help

them develop a more comprehensive and grasp of language usage (Nilubol and Sitthitikul, 2023). Furthermore, it has been demonstrated that gamification enhances speaking and listening abilities since learners frequently interact with virtual environments that mimic natural language settings (Nurutdinova et al., 2021). Additionally, studies indicate that gamification can enhance reading comprehension, grammatical ability, and general language fluency (Wen, 2023). By incorporating game elements such as challenges, quests, and rewards, these gamified approaches not only captivate learners' interest but also create a conducive environment for honing a spectrum of language-related skills. These findings collectively highlight the potential of gamification as a versatile and effective tool for advancing specific competencies in ESL learning contexts.

In view of the previous literature, there appears to be a consensus among researchers regarding the principle that games-based learning can significantly enhance ESL learning outcomes. However, what has been lacking in the current understanding of gamification in ESL learning environment is the popularity and status of this subject among researchers. Additionally, there is limited information available on the number of citations of articles and highly cited authors pertaining to the topic of gamification and ESL. With this background, the main research objective of this paper is to display the authors and citations of publications where gamification is incorporated in ESL learning environment. In order to accomplish this, this work uses a bibliometric approach to pinpoint and characterize the usage of gamification in ESL, paying particular attention to elements like author connections and article citations. Investigating how gaming technology impacts ESL learning delivery and design, as well as information distribution across different domains and nations, is the driving force behind this work. Specifically, this paper aims to provide descriptive statistics on the current status of publications pertaining to the topic of gamification and ESL. Additionally, it uses Virtual Object System (VOSviewer) software to conduct citation, co-citation, and keyword analyses to produce visualizations of networks and clusters. The bibliometric-based approach used in this investigation is described in the section that follows.

Method

Bibliometric analysis is a statistical technique that helps detect developing themes within a certain subject by revealing patterns within a research problem (Donthu et al., 2021). Researchers utilize bibliometric analysis for various purposes, such as identifying new trends in article and journal performance, collaboration patterns, and research components, as well as investigating the intellectual framework of a particular field within the existing literature (Verma and Gustafsson, 2020; Donthu et al., 2021). Various bibliometric tools are available for visualizing outcomes, with VOSviewer being one of them. In this investigation, VOSviewer, an open-source bibliometric tool, was chosen for its intuitive interface and proven efficacy in previous research (Moral-Muñozet et al., 2021; Pessin et al., 2022). With a focus on citation networks inside the connections of individual publications, this tool analyses publications at the level of individual citation connections. It gathers data from reputable sources like Google Scholar, Web of Science, and Scopus. For the current study, the Scopus database serves as the primary source for data extraction and analysis, aiming to identify predominant themes in literature through a meticulous clustering process.

VOSviewer is purposefully crafted to seamlessly integrate with the textual output from Scopus, rendering it the

preferred database for executing an exhaustive exploration of publications related to gamification. This choice is grounded in the straightforward importation of Scopus-generated data into the VOSviewer platform. The search strategy applied to Scopus entailed the use of the Boolean logic operator AND, combining the terms (gamification), (English), (second), and (language). This operator guarantees the retrieval of information precisely aligned with the specified terms in the Scopus search field TITLE-ABS-KEY. Further refinement of the search was implemented to include only published documents between the years 2011 and 2023. Without specifying document types, the search yielded a total of 61 records. The settings used in the Scopus advanced query panel are shown in Figure 1.

Analyze search results

< Back to results

(TITLE-ABS-KEY (gamification) AND TITLE-ABS-KEY (english) AND TITLE-ABS-KEY (second) AND TITLE-ABS-KEY (language))

61 document results   Selec

Figure 1. Scopus search parameters and Boolean operator 'AND'

Scholars consistently stress the crucial need for research to demonstrate excellence and societal impact. Employing bibliometric analysis stands out as a key approach to meeting the inherent standards that contribute to achieving these objectives. Nonetheless, as Bruzgė and Šapkauskienė (2021) have highlighted, the attainment of accurate and observable results necessitates a comprehensive understanding of the methods and procedures involved. The procedures in this study entail several phases. The initial phase involves data retrieval, wherein the search outcomes are exported from Scopus in Comma Separated Values (CSV) file format. The next phase involves importing these records into VOSviewer and saving them in a format that is appropriate for the software environment. Subsequently, VOSviewer is employed to scrutinize the citation relations among the retrieved records. Figure 2 visually depicts the structural arrangement of this research.

This paper serves dual primary objectives. The initial segment furnishes descriptive statistics derived from the publication search executed on the Scopus database. The focal points of these descriptive analyses encompass highly cited articles, an investigation of publication trends, and type of document publications. The intent behind these findings is to pinpoint the most salient themes or topics prevalent among researchers. The subsequent subsection of the bibliometric analysis entails a database search on Scopus. The visualization analysis incorporates citation links among authors and employs cluster analysis via the VOSviewer software. The software facilitates the generation of authors maps derived from network-based, constructs keyword maps by discerning shared networks, and compiles maps encompassing a multitude of items. The VOSviewer software, as elucidated by Bukar et al., (2023), Kuzior et al., (2022), and Effendi et al., (2021), enables the processes of data mining, mapping, and grouping of articles obtained from the database. This tool proves instrumental in elucidating patterns, relationships, and thematic clusters within the collected scholarly material, contributing to a comprehensive and visually accessible representation of the research landscape. This phase explores the relationships and thematic groupings of authors, offering a more sophisticated understanding of the academic

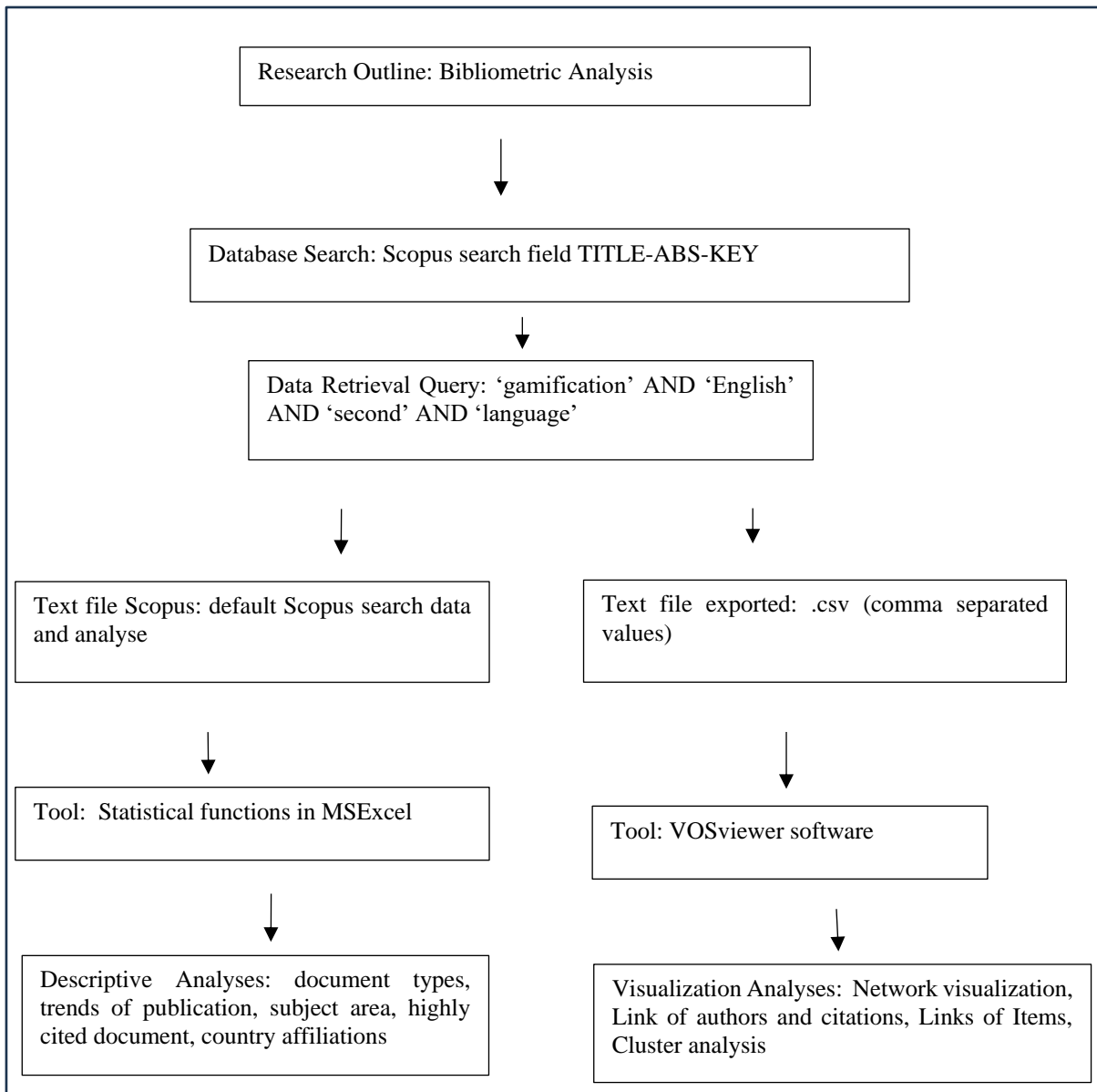environment in the designated field of study.

Figure 2. Outline of Research Methodology

Results

The landscape of gamification applications is diverse, posing challenges for researchers exploring various games that foster learning, encourage education, a variety of social interaction modalities, and learning environments Ciuchita, et al., (2023). Consequently, this section augments existing research by elucidating the current research landscape of gamification in support of the ESL learning environment, aiming to guide future researchers in their endeavors. This segment comprises two analyses, with the initial analysis geared towards presenting descriptive statistics derived from the existing research. All data in this subsection are sourced from the Scopus database search. In the subsequent subsection, the analysis takes a more focused approach on visualization, wherein

documents, citations, and links between authors are visually represented based on the outcomes generated by VOSviewer. This approach provides an understanding of the relationships and connections within the researched domain, enhancing the depth of insights derived from the analysis (Huang et al., 2022).

Descriptive Results

In the Scopus database, for the period 2011–2023 in all 11 subject areas, the items 'gamification' AND 'english' AND 'second' AND 'language' encompasses 61 documents, of which 33 articles, 20 conference papers, 5 book chapters, 2 reviews and 1 conference review. Detailed document types can be seen in Table 1.

Table 1. Number of Documents by Types

Document	Number of Document (%)
Article	33 (54.2)
Conference Paper	20 (32.2)
Book Chapter	5 (8.5)
Review	2 (3.4
Conference Review	1 (1.7)

Observing the data, it is evident that articles are the most prevalent type of document concerning the topics 'gamification,' 'English,' 'second,' and 'language,' followed by conference papers. Notably, there has been no publication of books on these specific subjects thus far.

The popularity of documents can be gauged through the number of citations they receive. Table 2 presents the top ten articles with the highest citation counts.

Table 2. Top-ten Highly Cited Articles and their Authors

Authors	Title	Cited by
Dehghanzadeh et al., (2021)	Using gamification to support learning English as a second language: a systematic review	94
Reitz et al., (2016)	VR-based gamification of communication training and oral examination in a second language	19
Hong et al., (2018)	Effects of gamifying questions on English grammar learning mediated by epistemic curiosity and language anxiety	18
Pinto et al., (2021)	Foreign language learning gamification using virtual reality—a systematic review of empirical research	25
Kayimbaşioğlu (2016)	Integration of Gamification Technology in Education	42
Kétyi (2016)	From mobile language learning to gamification: An overlook of research results with business management students over a five-year period	15
Anak Yunus and Hua	Exploring a gamified learning tool in the ESL classroom: The case of	27

Authors	Title	Cited by
(2021)	Quizizz	
Idris et al., (2020)	Game-based learning platform and its effects on present tense mastery: Evidence from an ESL classroom	17
Homer et al., (2018)	Comparing digital badges-and-points with classroom token systems: Effects on elementary school ESL students' classroom behavior and English learning	42
Arif et al., (2019)	Benefits and challenges of using game-based formative assessment among undergraduate students	27

The presented table clearly indicates that systematic review articles have garnered the highest number of citations. This finding aligns with trends observed in various research domains, where review articles tend to be both widely read and highly cited.

Moreover, these citations are occasionally linked to the countries with which the respective articles are affiliated. The affiliations of the top five countries for these documents are concisely outlined in Table 3.

Table 3. Top-5 Country Affiliations in Scopus

Rank	Country	Number of Document (%)
1	Spain	9 (30)
2	China	7 (23.3)
3	Malaysia	7 (23.3)
4	Japan	4 (13.3)
5	Taiwan	3 (10)

As depicted in Table 3, while authors affiliated with Spain lead in the number of Scopus publications on the topic, it is noteworthy that the combined number of documents from other countries significantly surpasses Spain's contributions. This observation underscores the absence of dominance by a single country in this context.

The descriptive analysis is incomplete without analyzing subject areas that are normally used the items for 'gamification' AND 'English' AND 'Second' AND 'Language'. Top ten subject area are presented in Table 4.

Table 4 Top-10 Subject Area in Scopus

Subject Area	Number of Document (%)
Social Science	41(31.3)
Arts and Humanities	34(26.0)
Engineering	14 (10.7)
Psychology	10 (7.6)
Decision Science	8 (6.1)
Health Professions	5(3.8)

Subject Area	Number of Document (%)
Energy	5(3.8)
Mathematics	4 (2.3)
Business, Management and Accounting	3(2.3)

The table above clearly illustrates that Social Science and Arts and Humanities collectively account for more than 50 % of the subject area. This observation suggests that these specific subject areas likely incorporate games into the ESL learning environment.

Beyond merely relying on the quantitative metric of citation counts, the popularity of the identified items can be discerned by scrutinizing publication trends over time. Moreover, analyzing the trajectory of publications against the respective years of their release facilitates an understanding of the current status of these items. To gain insights into the popularity and contemporary relevance of the selected items, Figure 3 has been devised to illustrate the temporal trends in publications within the specified timeframe.
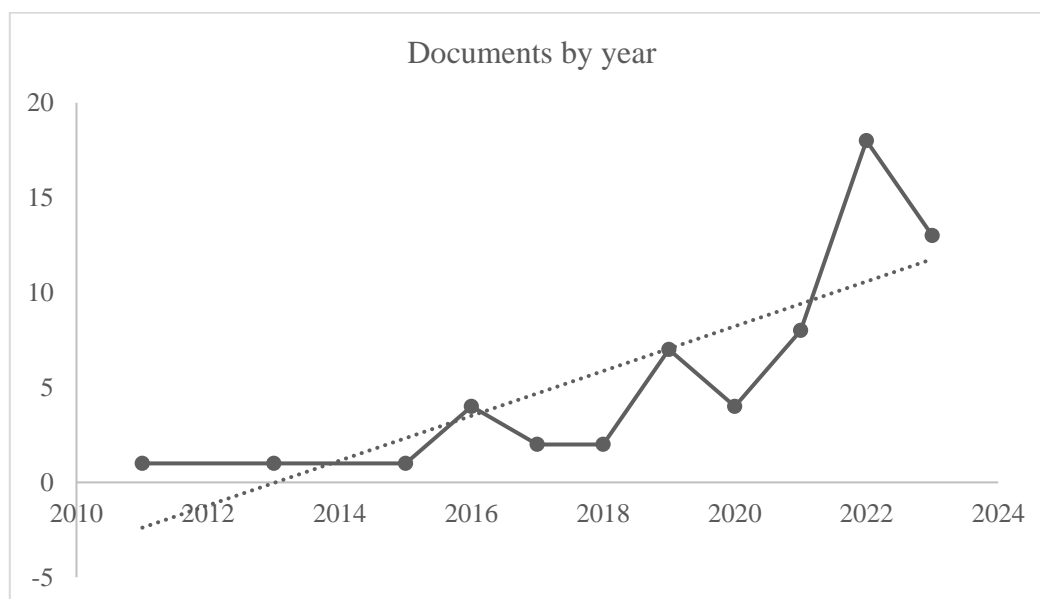

Figure 3. Trends of Publication from the Year 2011-2023

This graphical representation serves as a valuable tool for gauging the enduring interest and currency of the search items within the designated year range. As depicted in Figure 2, there is a discernible surge in researchers' interest in publishing on the topic, particularly post-2018. This substantial growth is evident over the span of five years, escalating from 7 documents in 2019 to 18 documents in 2022. The publication trend from 2019 to 2022, focusing on gamification in the ESL learning environment, exhibits a gradual but consistent rise in recent years. The linear positive slope observed in these trends suggests an anticipation of further expansion in the number of documents in the years to come, surpassing the current count of 18. This upward trajectory signifies an enduring and increasing scholarly interest in exploring and contributing to the discourse on gamification within the context of ESL learning.

Visualization Results

Using the VOSviewer program, we performed a text-based analysis of the title, keywords, and abstract fields in order to gain a deeper understanding of the major themes based on the documentary clusters. The 61 publication records imported into VOSviewer. The publications were released between 2011 and 2023. Each article is assigned a citation score based on the number of links it has established with other publications. As seen in Figure 4, the display was changed to show the authors and links with the highest citation scores.
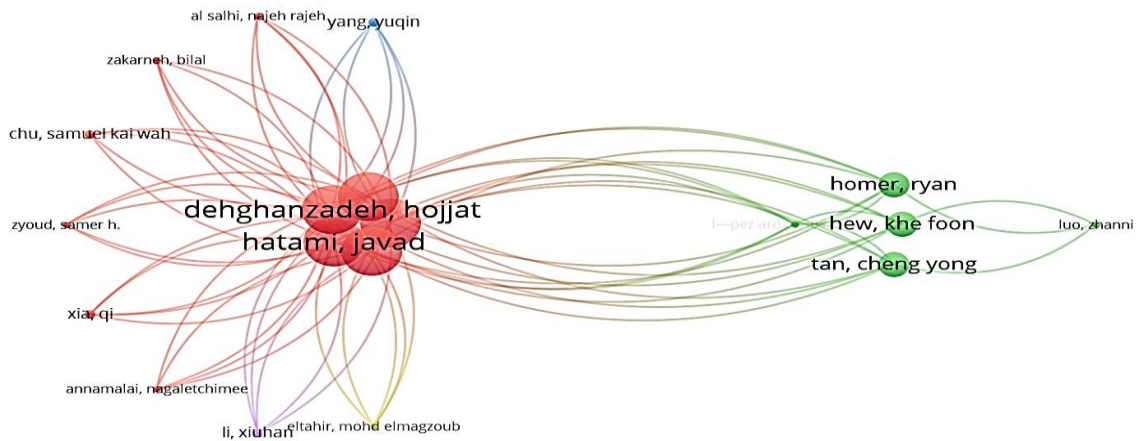

Figure 4. Top Authors in terms of Citation Links

The visual representation of the network above reveals the existence of five distinct authors, each characterized by an identical number of citations. These clusters exhibit close proximity, mirroring the size of the red bubble. This proximity implies that the authors within each of these five groups collectively receive an equivalent number of citations. Each bubble is vertically orientated on the Y-axis in accordance with the year of publication and identified with the first and last names of the first author. Each bubble's location on the X-axis indicates how close an article is to other publications, and the lines connecting bubbles show whether citation linkages exist between publications (Hota et al., 2020). The labels of link and citation for red bubbles are shown in the figure. We may also see a citation map in this visualization, where the distance between objects indicates how related they are to one another. According to McAllister et al., (2022), entries in a citation map are more connected the closer they are to one another.

The second analysis is to see the link among keywords. Figure 5 shows the network visualization where the size of the label and the circle of an item is determined by the weight of the item. In Figure 5, it is discernible that the item labeled 'gamification' has been assigned the highest weight, denoted by both the size of its label and the corresponding circle. The connections between items are graphically represented by lines, symbolizing the links between them. Notably, 'gamification' exhibits linkages with all other items depicted in the figure.

The spatial relationship between two journals, as indicated by the distance between them, reflects their relatedness in terms of co-citation links. The observed proximity or distance between items provides valuable insights into their interrelatedness. Significantly, the items 'second language' and 'gamification' emerge as closely positioned, suggesting an inherent and profound connection between these two components. This spatial association implies a noteworthy degree of inseparability between the aforementioned items.
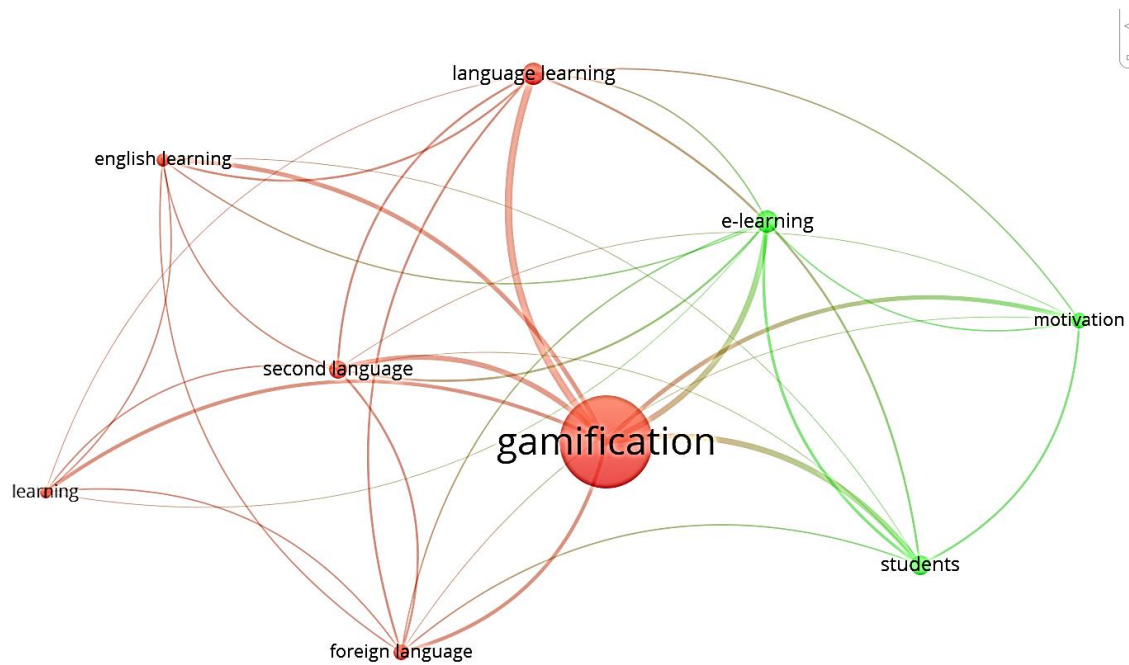
Figure 5. Network Visualization of terms based on Co-citation Links

The articles were then divided into groups using the clustering application VOSviewer. By using their relativeness to other articles in the network, this technique groups articles into clusters (van Eck & Waltman, 2014). To find the number and size of each cluster, the tool needs its advanced parameters adjusted. After maximum 1000 iterations, step size reduction at 0.75 and initial step size at 1, the items were chosen to generate two clusters. The two clusters of items are displayed in Figure 6.
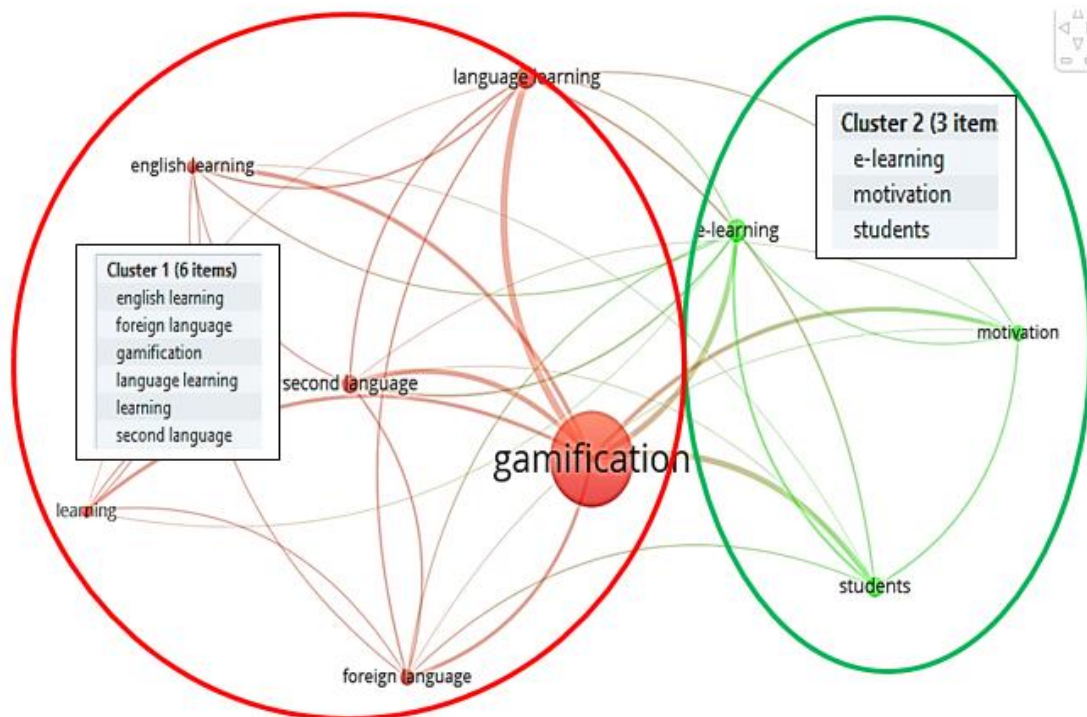

Figure 6. Two-cluster of Items Network

The analysis reveals that Cluster 1 encompasses a total of 6 items, whereas Cluster 2 comprises 3 items. The heightened color intensity observed in Cluster 1 alludes to a greater density of co-citation connections within this cluster, implying a more robust co-citation network compared to Cluster 2. A comprehensive elucidation of the characteristics and significance of these clusters is expounded upon in the subsequent section.

Discussion

This section furnishes a comprehensive overview of the pivotal publications associated with each of the 9 dominant items depicted in Figures 5 and 6. In the process of cluster nomenclature suggestion, a meticulous analysis of article titles, keywords, and the VOSviewer output has been undertaken. Consequently, it is proposed that the two identified clusters be designated as follows: "Gamification in Language Learning-Cluster 1" and "Gamification and Students Motivation-Cluster 2."

The determination of these cluster names was guided by a meticulous scrutiny of keywords, document titles, and the outcomes derived from VOSviewer analysis. This naming convention is deemed pertinent and reflective of the primary thematic foci encapsulated within each cluster. The prominence of gamified-based learning, known for its interactive and engaging nature (Bachtiar et al., 2018); (Behl et al., 2022) highlights the significance of identifying the foremost research themes in the domains of language learning and motivation.

Gamification in Language Learning-Cluster 1

Observably, the focal point of these materials revolves around the realm of language acquisition. Three of the entries delve into studies centered on language learning, encompassing English acquisition, with one article focusing on keyword acquisition. The remaining two entries scrutinize the acquisition of a second language and a foreign language, all joined to the overarching theme encapsulated by the most prominent red bubble—gamification. To elucidate, the item closely associated with the predominant red bubble pertains to second language acquisition. The work authored by Flores and Francisco (2015) delves into methodologies and approaches employed in second language learning while exploring emerging trends in the integration of technology within second language instruction. The subsequent closest article delves into the utilization of gamification in the context of foreign language learning.

Notably, Zubkov (2023) recently explored the implementation of gamification strategies in foreign language instruction specifically tailored for economics students. The author posits that the research findings furnish concrete evidence of advancements in language skills resulting from the introduction of gamification. The third item interlinked with the theme of gamification pertains to language learning. An illustrative case involves the integration of a game employing an expert point cloud recognizer in the learning of the Japanese language (Udjaja, 2018). This game-based recognizer serves to facilitate understanding of Japanese by engaging the sensory and motor nervous systems, thereby motivating students to intensify their study efforts. The suggested cluster aligns with the claim that games enhance the development of student language skills and make learning more enjoyable by making lessons engaging (Demirbilek et al., 2022). It can be posited that gamification tools prove to be highly

beneficial in language-oriented learning environments, where learner activities are digitally represented.

Gamification and Students' Motivation-Cluster 2

This cluster encompasses items that explore the intersection of gamification and motivation, as evident in the visualization where the nearest bubbles to the prominent red bubble are those labeled "student" and "motivation." The items within this thematic context delve into strategies for achieving effective learning outcomes through the incorporation of structured games, aiming to discern the impact of gamification on student motivation. Casanova-Mata (2023) recently conducted an experiment to see if there was a substantial impact on the acquisition of English language competency, motivation, attention, and emotions in an ESL learning environment. Her finding is consistent with the general theme of this cluster, in which gamification assisted to improve the variables studied, with the experimental group demonstrating considerable improvements in reading as well as a more favorable attitude towards the English learning. Buckley and Doyle (2014) posited that gamification not only exerts a positive influence on student learning but also yields favorable effects on student participation, contingent upon the nature of the student's intrinsic or extrinsic motivation.

Gamification has been found to enhance engagement, motivation, and participation among ESL learners (Boudadi, and Gutiérrez-Colón, 2020). In a comparative study involving a substantial sample size of two hundred students, Chapman and Rich (2018) found that a gamified course had an overall motivational effect on students. This conclusion is substantiated by a significant percentage, with 67.7% of respondents indicating that the gamified course was either more or substantially more motivating than a traditional course. Notably, mediating factors such as the gender and age of students did not present impediments to perceiving gamification as a motivational factor. These insights hold practical significance for educators and learning practitioners engaged in the design and implementation of educational digital games across various educational levels. The implications are particularly relevant for those seeking to amplify student motivation and augment learning outcomes.

Conclusion

The delivery of effective teaching and learning processes is facilitated by gamification, deemed an essential tool for educators. The objectives of this study encompassed assessing the recent status of publications in gamification-ESL, focusing on descriptive statistics and visualization of highly cited articles along with their correlation with authors. Two bibliometric tools were employed for this study. Scopus database was utilized to retrieve bibliometric information such as citations, bibliographic details, and abstract & keywords, which were then statistically analyzed to capture the prevailing status of gamification use in ESL learning environments. The second bibliometric tool, VOSviewer software, was employed to visualize citation and co-citation links among authors and keywords.

Additionally, this tool facilitated the creation of new research clusters based on keywords. The statistical findings revealed that the majority of gamification and ESL publications are prevalent in the subject areas of Social Science, Arts & Humanities, and Psychology. Moreover, the analysis indicated a positive upward trend in

gamification and ESL publications from 2011 to 2023. The visualization results disclosed five author groups with identical citation counts, while cluster analysis identified two crucial clusters characterizing the use of gamification in ESL learning environments, namely gamification in language learning and gamification & student motivation.

Recommendations

The implications of this study extend to various stakeholders, providing valuable insights for serious game designers, particularly in understanding knowledge domains dominating the constructive use of gaming applications. This analysis of gamification in ESL learning environments has limits despite its contributions. Access to alternative article databases and citation-relation techniques is limited by the use of bibliometric data obtained exclusively from the Scopus database and the VOSviewer software. To get a whole picture of this phenomenon, future survey-based research comparing student and instructor experiences across fields, education sectors, and nations would be beneficial. Future studies could also look at how gamification frameworks, gaming devices, and applications affect teaching strategies and student outcomes in various educational contexts. The authors hope that this paper offers insightful information about using gamification in ESL classrooms.

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