



A Bibliometric Analysis of Digital Game-Based Language Learning to Support Future Language Learning

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ABSTRACT

There are several advantages that language students can reap from playing digital games, one of which is that the process of teaching and learning can become more enjoyable. This study conducts analysis and evaluation of the most recent research on digital game based language learning (DGBLL). The research looks at the number of studies that have been conducted in the DGBLL field of language acquisition through the use of bibliometric analysis using Scopus databases and Vosviewer for data visualisation. In point of fact, the result of this paper is there are a great number of empirical study papers that, when combined, can provide information that is both more thorough and up-to-date pertaining to the topic of DGBLL. Researchers anticipate that there will be articles that provide an adequate review of the relevant literature. In the future, research and development of DGBLL will need to be carried out and refined. The demand for additional educational facilities in the future will make it inevitable.

CCS CONCEPTS

• Applied computing → E-learning.

KEYWORDS

language learning, digital game based language learning, future learning

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1 INTRODUCTION

Learners in the modern world engage in digital and online games. In the teaching and learning process known as "game-based learning," the educational potential of video games is frequently utilised (GBL). Considering that games may make learning more enjoyable

and increase student engagement, game-based learning has become increasingly prevalent in language instruction [20]. The majority of current research on games used in language acquisition has been conducted in the field of language acquisition, often known as "digital game-based language learning" (DGBLL) [27]. Even the researchers mention second language learning in addition to language learning in general. According to research, digital games provide multiple benefits for language learners, including making the teaching and learning process more fun [2, 6, 17, 22]. Indeed, games are amusing and have been demonstrated to make classes more enjoyable for pupils. Consequently, game development requires particular considerations. The results of a preliminary study indicate that interaction games do promote student participation in virtual exchanges; however, the results for the video communication (VC) condition are more encouraging than those for the virtual world (VW) condition [5]. The development of DGBLL follows the most recent technological advances. When building games, it is vital to examine a variety of technologies that are good for language acquisition. The previous study on DGBLL has yielded favourable results. In an introduction to a special issue on gaming, the author states: In a survey of digital games in academic contexts, 39 studies identified and classified them according to their focus [28]. The writers unearthed eleven publications on language learning and reached the conclusion that digital games tend to be more beneficial for language learners than for students of other courses (e.g., math and science). Lastly, Yuditseva [29] examined 26 studies from 2005 to 2015 that evaluated the effect of digital games on language acquisition. Yacob and Yunus demonstrate the utility of employing language games to teach and master grammar for ESL learners [26]. This study is useful for proving the usefulness of language games as a teaching strategy to enhance English grammar acquisition among students. In their scoping review, Xu et al [25]. investigate the current practices of digital game-based language learning to support English language learning in terms of participant characteristics, methodological features, game characteristics, and the relationship between game availability and game characteristics. Our findings indicate that (1) vocabulary is the most frequently practised language skill; (2) the methods employed were primarily quantitative with researcher-designed tests; (3) commercial games contain the most elements of a good game; and (4) the use of good gaming elements in digital games is inconsistent [25]. According to Pole and Midoora, 49 papers were discovered and then categorised by type of research, game genre employed, age, sample population size, and research topic (vocabulary acquisition, student perspectives, etc.).

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And suggested that a) both instructional and commercial games have positive benefits on language learning outcomes, b) digital games appear to be more beneficial for intermediate to advanced learners, and c) males have been researched more than females. According to a systematic evaluation of the literature conducted by Alper et al., the combination of GBL and AR in educational contexts leads to favourable student outcomes [1, 9]. Students greatly like playing games. The aforementioned research demonstrates that incorporating games into the learning process is certainly innovative. This research analyses and evaluates the current studies on DGBLL that examine the number of studies in the DGBLL field of language acquisition. Despite the fact that research on DGBLL is intriguing, it is evident that no studies on DGBLL research trends have been published. Therefore, the authors of this study opted to examine the Scopus database to determine the current trends in DGBLL research. To do this, responses to the following research questions were sought:

- What is the distribution of studies on the use of DGBLL in education, and what are the most cited?
- What are the most-used keywords in the field DGBLL?
- What countries and journals or proceedings made the greatest contribution to the field DGBLL?

2 RESEARCH METHOD

The objective of this study is to describe language acquisition using digital games. In this study, bibliometric techniques were utilised to identify relevant works in the Scopus database, which were chosen in order to identify trends in game-based language learning. The outcome is then reported. Review writing followed the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) criteria [16]. 1 depicts the PRISMA search process for locating and filtering analytical resources.

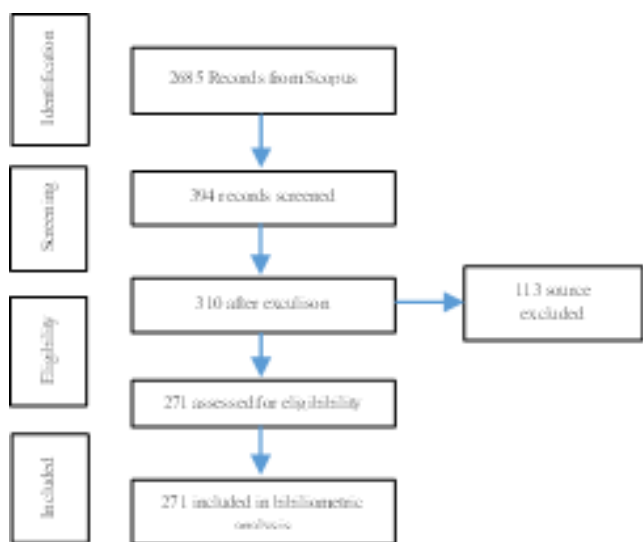


Figure 1: Protocol

2.1 Inclusion and Exclusion Criteria

- Eligibility criteria and The study used is in the form of international articles for the last ten years, starting from 2012-2022 and in English.
- Information sources and The electronic database used focuses on the Scopus.
- Search strategy and The search restriction uses the keyword “digital game-based language learning (DGBLL)” and the features provided by scopus.com with strings below. The study comes from the sub-areas of language learning from 2012-2022.

Studies found and evaluated in this literature search were included if they match with following criteria:

- Language: The study was written in English;
- Time Period: 2012-2022;
- Journal and/or Conference Proceedings: Peer-Reviewed;
- Unpublished studies were excluded;
- Lecturer Notes, Dissertations and Theses were excluded;
- Studies that investigate the DGBLL included: Studies that investigated beliefs about all digital games in general as a learning tool were excluded.
- The digital game used in language learning study is a game per the definition used in this review.

An online search was conducted using a database focused on Scopus. the search strings used in this search can be found below.

TITLE-ABS-KEY game AND based AND language AND learning AND LIMIT-TO EXACTKEYWORD, Language Learning OR LIMIT-TO EXACTKEYWORD, Language) OR LIMIT-TO EXACTKEYWORD, Second Language) OR LIMIT-TO EXACTKEYWORD, Foreign Language Learning OR LIMIT-TO EXACTKEYWORD, Second Language Acquisition OR LIMIT-TO EXACTKEYWORD, Language Games OR LIMIT-TO EXACTKEYWORD, Language Acquisition OR LIMIT-TO EXACTKEYWORD, Digital Game-based Language Learning OR LIMIT-TO EXACTKEYWORD, English-as-a-Foreign-Language AND LIMIT-TO PUBYEAR, 2022 OR LIMIT-TO PUBYEAR, 2021 OR LIMIT-TO PUBYEAR, 2020 OR LIMIT-TO PUBYEAR, 2019 OR LIMIT-TO PUBYEAR, 2018 OR LIMIT-TO PUBYEAR, 2017 OR LIMIT-TO PUBYEAR, 2016 OR LIMIT-TO PUBYEAR, 2015 OR LIMIT-TO PUBYEAR, 2014 OR LIMIT-TO PUBYEAR, 2013 OR LIMIT-TO PUBYEAR, 2012

After the search strategy is used to sort through the 2685 sources, only 310 sources remain that match the focused theme. The next step is to collect data and put it into groups based on the themes and subthemes of the DGBLL. From 2012 to 2022, empirical research will be done on these themes and subthemes. After the data is put into groups, the author can do a synthesis to describe the discussion about DGBLL. A bibliometric method was used to look at the data that was gathered [9]. Through bibliometric analysis, the most important people in the field, the most important articles, and the most recent progress can be shown [21]. There are two kinds of bibliometric analysis: descriptive and evaluative. Evaluation studies look at how the papers affect future research. Descriptive studies try to figure out how many articles are written in a given year. In this study, bibliometric analysis was done based on six categories:

(1) the number of articles and citations, (2) the most cited papers, (3) the most frequently used keywords, (4) the most influential countries, (5) the most influential institutions, and (6) the most influential journals. The data is then put into tables and a bibliometric network map is used to show the most cited papers, the most used keywords, and the most influential countries, institutions, and journals. Bibliometric analysis and network maps were made with the VOSviewer 1.6.18 tool, which gets bibliometric data and makes graphical network maps to show how data is related and make it possible to study data in an interactive way [16]. Bibliometric research goes beyond just defining things to also describe them. This helps [16] scientists evaluate scientific publications and get the most out of their resources. In this method, descriptive data are put into a table and then mapped to show how the data are related.

2.2 Result

The distribution of the 271 studies that were obtained from the Scopus database and were based on the use of digital game-based language learning is presented in Figures 2 and 3, along with a total of 2123 subsequent citations for these studies. These figures are presented for each year that was included in the period that was analysed. 2 shows that research papers on digital game based



Figure 2: Document by year

language learning from 2012 to 2021 have increased. Between 2013 and 2018, the increase and decrease were shown until 2019 (n=38) continued to increase and peaked in 2021 (n=54). Judging from the distribution of citations in published articles, it can be seen in 3 showing an increase from year to year starting from 2012. The maximum number of increases was achieved in 2021 as many as 577 citations. The data on the top 10 most cited articles and the conclusions drawn from the analysis carried out with Vosviewer are presented in 1 for your perusal. This allows you to examine the articles that have received the most citations as well as the connections that exist between them. The only citations that were counted were those that came from outside sources; in-house references from any of the authors were disregarded. The articles that were cited the most in the DGBLL study were written by Hung, et al and given the titles A scoping review of research on digital game-based language learning and Competition and students perceptions in a game-based language learning environment" [13, 14]. Both of these articles are related to earlier research; that was conducted

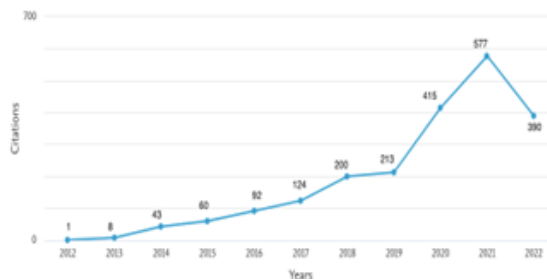


Figure 3: Citation by year

by Vandercruysse et al. [23] and given the titles Competition and students perceptions in a game-based The article by Hung et al. was mentioned 107 times in total. This data may change over time.



Figure 4: Network map of citation



Figure 5: Network map of keyword

Language acquisition, digital games, and development are prominent key terms. The keyword language learning relates closely to digital games, technology, case study, evaluation, and interaction. The terms language learning, development, technology, vocabulary, and influence are closely associated with the keyword digital game. Keywords like a second language, strategy, mobile application, and

Table 1: Top 10 cited document

| Year | Document sources | Total citation |
|------|------------------|----------------|
| 2013 | [19] | 184 |
| 2018 | [15] | 130 |
| 2017 | [12] | 121 |
| 2015 | [24] | 117 |
| 2018 | [14] | 107 |
| 2013 | [23] | 76 |
| 2016 | [18] | 55 |
| 2012 | [7] | 55 |
| 2014 | [10] | 53 |
| 2012 | [8] | 47 |

the impact that emerge but are not yet closely related are also highlighted. This indicates that there is still a great deal of potential for research on the subject of DGBLL. Additionally, data on the most influential countries and the most influential periodicals featuring DGBLL are shown.

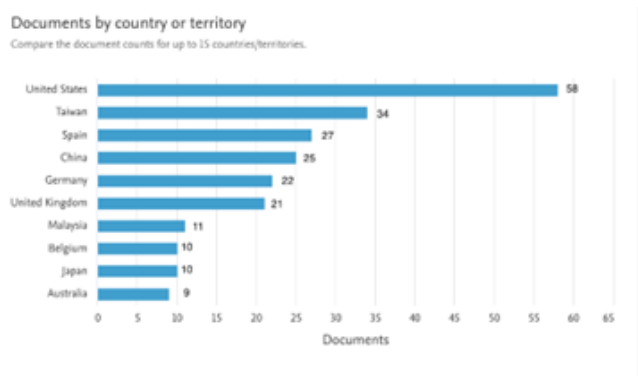


Figure 6: 10 most influential country

The graphic depicts the ten countries that conduct the most research on DGBLL. The United States was the leading contributor n=58. Taiwan n=34 was the second country represented. Spain was the third country n=27. China n=25, Germany n=22, the United Kingdom n=21, Malaysia n=11, Belgium n=10, Japan n=10, and Australia n=9 come next.

Since 2013, the ACM International Conference Proceeding Series has published 14 publications incorporating DGBLL, with a peak in 2020 (n=5) and an SJR citation impact score of 1.0. (0.232). The journal Sustainability Switzerland will begin publishing in 2019 and reach its current peak in 2021 (n = 5) with a 5.0 SJR citability index (0.664). In addition, the publication Plos One, the British Journal of Educational Technology, and the COEUR Workshop Proceedings were consulted.

3 DISCUSSION

In the contemporary digital era, it gives a unique place for the creation of learning material such as video games. DGBLL appears to be one of the research pertaining to language education and

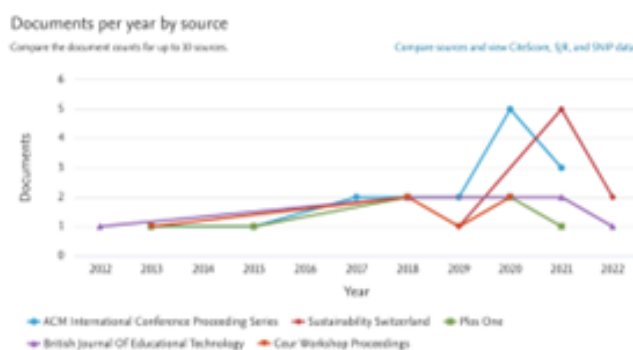


Figure 7: Document per year by source

learning. DGBLL is here to provide a learning atmosphere that is enjoyable and conducive to student learning. DGBLL is a specific variant of DGBL that emphasises language acquisition. After the Covid-19 pandemic, which drastically altered the teaching and learning methods, there is a need for development. The development of digital game-based language learning will undoubtedly give scientific advances and practical benefits to the language-learning community. This is crucial for the education of teachers of foreign languages because it improves the way teachers teach languages using digital games [3]. Significant terms include language learning, computer games, and development. There is a close relationship between the terms "digital games," "technology," "case study," and "evaluation" and "language learning." The terms language learning, development, technical progress, vocabulary expansion, and influence are all intrinsically linked to the concept of the digital game. Identified as well are keywords such as a second language, strategy, mobile application, and impact that emerge but do not yet have a strong relationship. This suggests that there is a substantial need for greater research on DGBLL. A recent study on DGBLL that can be examined further to identify future research gaps. Prospective educators viewed the use of digital games to learn a foreign language positively; nevertheless, they lacked expertise regarding how to achieve this objective in practice [11]. That is, future development must consider all elements of the game's content that

can be incorporated in the real world. Regarding the citation from the DGBLL-themed study, the article by Hung et al. was cited 107 times. The article is a scoping review. In reality, there are numerous empirical study publications that can be combined to provide more comprehensive and current information in the subject of DGBLL. The presence of articles with adequate literature review is expected by researchers. Subsequent research on the efficacy of in-game feedback revealed that the regression analyses conducted revealed that an element known as KCR feedback may be a positive predictor of short-term vocabulary learning, whereas other factors did not appear to have a statistical effect on the level of significance which the researchers regarded important SLR studies can provide researchers with the knowledge they need. The combined material from the publications increases our understanding of DGBLL application design. As the area develops, it will also help us create rules and identify patterns of effectiveness [4]. Future research and development of DGBLL must be conducted and refined. Future need for educational facilities will necessitate it.

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