Focus on ELT Journal
Vol 5, Issue 1, 2023
ISSN: 2687-5381

A descriptive analysis of digital game-based foreign language education

[a]İbrahim Yaşar Kazu **[b]Murat Kuvvetli**
[a]Assoc. Prof. Dr., Fırat University, Türkiye, iykazu@firat.edu.tr
[b]English Teacher, Türkiye, 202401101@firat.edu.tr

APA Citation: Kazu, İ. Y., & Kuvvetli, M. (2023). A descriptive analysis of digital game-based foreign language education. *Focus on ELT Journal, 5*(1), 56-73. https://doi.org/10.14744/felt.2023.5.1.4

ABSTRACT

Digital games are increasingly being used for foreign language learning; a trend that has grown popular recently. This research dives deeply into this topic, assessing different skill areas targeted by these digital games, and how they are utilized in various settings worldwide - educational and otherwise. The research takes into account studies carried out between 2010 and 2021. The study's methodology is rooted in qualitative research, specifically the embedded theory design, and the gathered data is interpreted through a descriptive analysis approach. Out of an initial pool of 145 academic studies reviewed, 57 met the necessary criteria for inclusion, such as quality of data, sample size, year of publication, gender balance, and content relevance. The analyzed data is then expressed in terms of frequency and percentages for simplicity and easier understanding. The findings show that studies focusing on the use of digital games for foreign language learning have multiplied in recent years. However, a large proportion of these studies are heavily focused on vocabulary acquisition. This led to the suggestion that future work in this area should broaden its scope to include other important language skills like reading, writing, and listening, in addition to vocabulary.

Keywords
descriptive analysis, digital games, language education, language skills

Article History
Received : 12.01.2023
Revised : 24.04.2023
Accepted : 01.06.2023
Published : 30.06.2023

Type
Research Article

Introduction

Technological advancements in recent years have presented new opportunities in the field of education, and one such possibility is the integration of digital games in foreign language teaching. The use of digital games offers a unique perspective on education and provides several benefits. These games are learner-centered, meaning they are designed to be instructive, interesting, and appropriate for learners' levels and ages. Digital game-based foreign language teaching has gained significant importance, particularly due to the COVID-19 pandemic, and numerous studies have highlighted its significance in language learning. By leveraging digital games, learners can overcome learning anxiety, increase motivation, and alleviate difficulties in comprehending and solidifying language concepts. Consequently, educational benefits are observed across various domains. Several studies have demonstrated the positive impact of digital games on foreign language learning, aligning with Krashen's theory. The experiences acquired through gameplay can prove beneficial for students. According to Krashen (1982), learners need to be actively engaged and highly motivated to acquire the desired information. Furthermore, Klimova and Kacet (2017) suggest that digital game-based foreign language teaching offers certain conveniences in the language learning process.

✉**Corresponding Author:** iykazu@firat.edu.tr

In conclusion, the use of digital games in foreign language teaching holds immense potential. It aligns with a learner-centered approach, provides educational advantages, and has been supported by research. By integrating digital games into language learning, educators can create engaging and effective learning environments that enhance students' motivation, comprehension, and retention of language skills. Moreover, as highlighted by Klimova and Kacet (2017), digital game-based foreign language instruction offers several conveniences that streamline the language learning process. These include providing visual and sensory input in the target language, emphasizing specific aspects of grammar such as vocabulary and syntax, and promoting consistent practice and steady progress in language learning and acquisition.

One crucial aspect emphasized in these areas is that students engaged in digital games exhibit high motivation, leading to more lasting learning outcomes (Poole & Clarke-Midura, 2020). This can be attributed to the fact that individuals growing up in the era of technological advancements generally have a keen interest in technology and digital games. When learners are exposed to digital game-based learning, they become active participants in the learning process, which in turn enhances their motivation to work and engage with the content. Learning while having fun is a key advantage of digital game-based learning, and it can be further enhanced by incorporating educational themes that stimulate students' thinking and evaluation skills. By combining the interactive and immersive nature of digital games with educational content, learners are encouraged to think critically, problem-solve, and evaluate different scenarios within the game environment.

Digital platforms can enhance Digital Game-Based Foreign Language Learning (DGBLL) by evaluating learners' progress and engagement. They provide personalized feedback through data analysis of performance, enabling educators to customize instruction based on identified areas for improvement. Moreover, DGBLL fosters creativity and collaboration, as students produce meaningful artifacts from game-based activities. This method also accommodates various types of intelligence by leveraging diverse game mechanics, visuals, and interactive elements. In essence, DGBLL presents numerous advantages such as increased motivation, effective learning outcomes, data-driven evaluations, fostering creativity, and addressing learning diversity. Thus, digital games allow educators to craft dynamic learning environments promoting active participation, profound understanding, and enjoyment in language learning.

Literature Review

In the 21st century, the incorporation of technology in education has become an unavoidable aspect. Its integration in educational settings is constantly expanding to motivate students to utilize technology in language learning, enhance classroom dynamics, foster learner autonomy, and improve student learning outcomes (Kessler, 2018). Additionally, several researchers and educators, such as Kohnke (2021), Kohnke and Moorhouse (2020), and Wang and Tahir (2020), have highlighted the growing adoption of digital apps and tools as a more engaging alternative to traditional exercises in education. Specifically, tools like Mentimeter and GoSoapBox have gained popularity among teachers seeking to create interactive and dynamic learning experiences for their students (Kohnke, 2021; Moorhouse & Kohnke, 2020; Wang & Tahir, 2020).

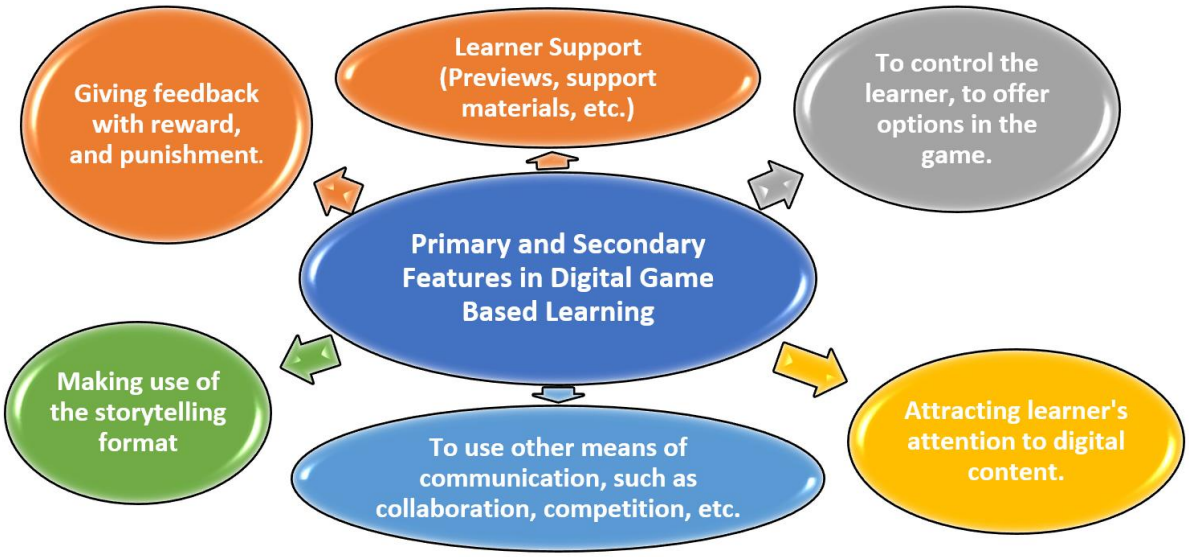
Online games and digital game-based learning are closely related and often used interchangeably. An online game refers to any computer-based game played over the Internet, where the games are stored and played directly from servers (Roslina & Azizah, 2008). Consequently, digital game-based learning encompasses learning experiences that involve playing electronic games (Tang et al., 2009). Digital games have garnered widespread interest

from individuals around the world, and the global video game industry has witnessed substantial growth. It was projected that between 2010 and 2019, the global video game business would expand by 30% to reach a market value of $19.6 billion (Hamizul & Rahimi, 2015). A recent survey on video game usage found that 49% of the 2,001 respondents claimed to play video games, with 10% reporting that they have an 'avatar' character (Hamizul & Rahimi, 2015). The popularity of digital games and the engagement of individuals with gaming present opportunities for incorporating online games and digital game-based learning into educational contexts. By leveraging the existing interest and enthusiasm for gaming, educators can create engaging and immersive language learning experiences. Integrating online games and digital game-based learning in language instruction not only increases motivation but also fosters active participation, critical thinking, problem-solving skills, collaboration, and creativity.

The integration of digital apps, tools, online games, and digital game-based learning in education allows for active student participation, instant feedback, increased engagement, and the promotion of critical thinking and collaboration. It signifies a shift towards learner-centered approaches, empowering students to take an active role in their learning process. The widespread interest in digital games worldwide underscores the potential of leveraging game-based elements in language learning, facilitating enjoyable and effective educational experiences.

The increasing popularity of digital games in educational settings is not surprising. Educators have recognized the complexity and benefits of digital gaming, as well as its vast potential for effective and meaningful learning across various disciplines, over the past decade (Gee, 2007; McGonigal, 2013; Squire, 2009). However, research into the use of digital games in language teaching and learning began even earlier than many people realize (Hubbard, 1991; Phillips, 1987). In recent years, there has been a significant increase in theoretical and empirical research on the relationship between digital games and language development (Benson & Chik, 2011; Cornillie et al., 2012; Peterson, 2013; Reinders, 2012; Reinhardt & Sykes, 2012; Reinders & Wattana, 2012; Sykes et al., 2008; Sykes & Reindhart, 2012). Researchers, such as Nadolny et al. (2020), have contributed to the literature in this field, as demonstrated in Figure 1 of their work. The increasing body of research signifies the growing interest in exploring the potential of digital games for language development and learning. These studies have shed light on the effectiveness of incorporating digital games in language instruction, highlighting their ability to enhance motivation, engagement, language acquisition, and the development of various language skills. As research continues to evolve, educators can leverage these findings to inform their instructional practices and create more effective and engaging learning experiences through the integration of digital games in language teaching. The work presented by Nadolny et al. (2020) and other researchers contributes to the expanding body of knowledge in this field and reinforces the value of exploring the intersection of digital games and language learning.

Figure 1. *Primary and Secondary Features in Digital Game-based Learning*



The framework provided can serve as a valuable starting point for scholars interested in studying how game designers create games and the overall process of game design. Researchers and practitioners can utilize this framework to draw conclusions and gain insights into digital game-based learning (DGBLL). By employing this method, they can examine the effectiveness and impact of DGBLL on language acquisition and learning outcomes. In the realm of language acquisition, researchers have explored various theories to enhance our understanding of DGBLL. For instance, second language acquisition theories, such as the work of Pavlenko and Lantolf (2000), have been examined to shed light on the processes involved in language learning through digital games. Additionally, Krashen's hypothesis (Krashen, 1982), which focuses on reducing affective barriers in language learning within the socio-cultural theory, has also been considered in the context of DGBLL. Furthermore, it has been suggested that learners derive benefits from the experience of playing games while learning because they willingly acquire target information with pleasure. This notion aligns with the idea that enjoyable and engaging learning experiences can enhance motivation, resulting in improved learning outcomes. By incorporating digital games into language learning, educators can tap into learners' intrinsic motivation and create an environment where acquiring language skills becomes an enjoyable and immersive experience. DGBLL provides opportunities for learners to actively engage with the target language, practice language skills in authentic contexts, and receive immediate feedback, all of which contribute to more effective language acquisition. Additionally, the framework provided serves as a useful tool for researchers and practitioners to study the process of game design and explore the potential of DGBLL. By drawing on relevant language acquisition theories and understanding the motivational aspects of game-based learning, educators can create meaningful and engaging language learning experiences that promote effective language acquisition.

DGBLL has been explored concerning various aspects of language acquisition. While some studies have presented conflicting results (Kazu & Kurtoğlu, 2022; Lucht & Heidig, 2013; Jalali & Dousti, 2012), further research has focused on the effectiveness of DGBLL in vocabulary acquisition (Ebrahimzadeh, 2017; Jensen, 2017), grammar learning (Cornillie et al., 2017; Mehrpour & Ghayour, 2017), writing (Allen et al., 2014), and speaking skills (Hwang et al., 2016).

Kahoot! and a digital Bingo game have been effectively used to bolster learning in foreign language classrooms, introducing dynamic, interactive elements to education and evaluation processes (Mustika et al., 2014 ; Wang & Tahir, 2020). To maximize these benefits, instructors must have a comprehensive understanding of the topic and employ diverse teaching strategies alongside game-based activities. Equally, the rise of mobile technology like the Apple Watch, Fitbit, and Google Pixel earphones, coupled with augmented reality games like Pokemon Go, is shaping consumer engagement with games and learning experiences (Sykes, 2017). These technological advancements have not only popularized game-based learning but also added to the depth and versatility of language learning strategies (Peterson, 2012, 2013). However, careful implementation and integration with other language practices and communication methods remain crucial for a comprehensive language acquisition process. Ongoing research continues to refine these digital game-based language learning strategies, offering an array of engaging options for teaching and learning foreign languages.

In an envisioned foreign language class, students display a strong eagerness to engage in learning activities until the designated class period concludes, comparable to the motivation and sense of accomplishment observed when advancing levels in a game. Additionally, the teacher possesses the ability to offer tailored feedback and effectively collaborate with specific groups of students, despite a class size of 30 individuals. The integration of suitable digital games within the classroom setting facilitates the establishment of productive group dynamics and personalized learning experiences, thereby optimizing the teacher's pedagogical skills and expertise. This pedagogical approach is expected to persist and undergo further development, leading to significant transformations in the field of education.

The field of educational technology continues to show significant interest in DGBLL, emphasizing the need for enhanced game design to improve the quality of language learning experiences. This scoping study aims to address this need by conducting a comprehensive literature review on DGBLL. The study focuses on examining the characteristics of foreign language learners, methodological requirements, game characteristics, and their interrelationships. By investigating these areas, the study aims to gain a deeper understanding of the utilization of DGBLL in contemporary educational technology settings and emphasize the critical role of game design. Consequently, this study intends to bridge a gap in the existing literature by providing insights into the specific areas where DGBLL is employed in foreign language education and highlighting the importance of future research on the language skills targeted by digital games for language teaching. The following research questions guide the study's objectives.

- What are the methods and techniques in digital game-based foreign language teaching that has been carried out recently?
- When the studies conducted in recent years are examined, in which field of study has been carried out the most in digital game-based foreign language education?
- Which data collection methods are frequently used in digital game-based foreign language learning?
- In which field of study are the sample numbers used in digital game-based foreign language teaching more?
- Which is the most frequently used data analysis method in digital game-based foreign language learning?
- When the results of the research are examined, are the results mostly successful or unsuccessful for digital game-based foreign language learning?

Methodology

Context

The research study employed a qualitative approach using an embedded theory design. The methodology involved conducting a systematic literature review of academic studies published between 2010 and 2021. Inclusion criteria were established to select relevant studies, considering factors such as data quality, sample size, publication year, gender balance, and content relevance. Specifically, studies focusing on the use of digital games for foreign language learning were included. Exclusion criteria were also applied to the initial pool of 145 academic studies reviewed, with studies published outside the defined timeframe or those not directly related to digital games for foreign language learning being excluded. After applying the inclusion and exclusion criteria, a total of 57 studies met the necessary criteria for inclusion. Data from the selected studies were then analyzed using a descriptive analysis approach, and the findings were presented in terms of frequency and percentages. The results revealed an increase in studies focusing on the use of digital games for foreign language learning, with a predominant emphasis on vocabulary acquisition.

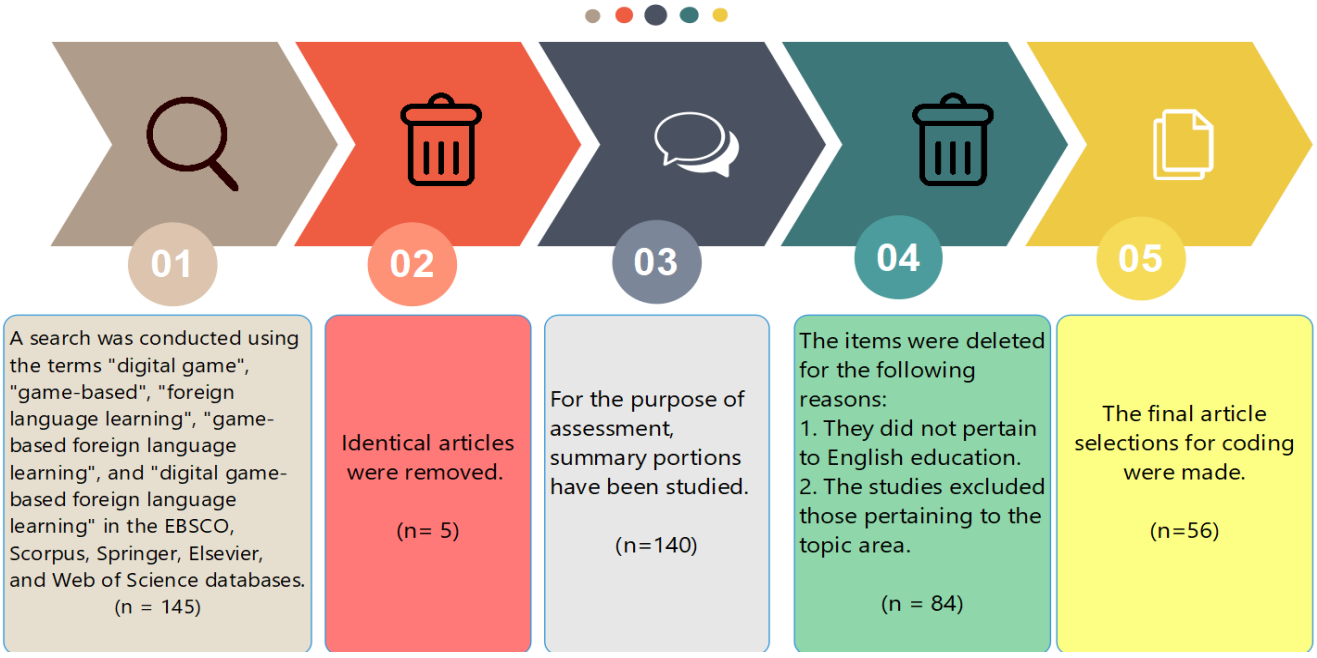
The case study method aims to delve into in-depth and descriptive inquiries, seeking to gain a comprehensive understanding of how different cases shed light on a particular issue or present unique instances. In line with this objective, content analysis was employed as the chosen technique to illuminate the research questions. Content analysis involves the systematic examination and interpretation of various sources, including theoretical models, professional expertise, and researcher-generated data. To ensure consistency in the interpretation of coding, two academics with comparable academic backgrounds and expertise in digital game-based foreign language learning (DGBLL) conducted the content analysis. This was done to establish uniformity and reliability in the coding process, following the guidelines set by Krippendorff (1980). The working group responsible for the analysis was led by a doctoral student who is also a fourth-year English instructor in the DGBLL research group. Additionally, the group included two associate professors who possess a combined experience of ten years in teaching, research, and publishing within the field.

Procedure

Content analysis refers to a systematic and rigorous examination of a text or communication to derive its underlying meaning (Neuendorf, 2017). In the field of education, content analysis serves various purposes, including the identification of patterns within the research literature on education and technology (Bozkurt et al., 2015; Shih et al., 2008; Zawacki-Richter & Latchem, 2018). In this study, content analysis was employed to identify common elements present in the textual content of articles published in the domain of digital game-based language learning (DGBLL) that align with the scope of content analysis.

This approach involved leveraging the similarities found within the analyzed materials to inform the coding and analysis process (Krippendorff, 1980). By employing content analysis, the research aimed to discern recurrent themes and examine the shared characteristics among the articles. Figure 2 presents the detailed methodology employed for evaluating and analyzing the identified articles. Content analysis is the methodical examination of a text or communication to deduce its meaning (Neuendorf, 2017). In education, content analysis is used for several purposes, including identifying patterns in the educational and technological research literature (Bozkurt et al., 2015; Shih et al., 2008; Zawacki-Richter & Latchem, 2018).

Figure 2. *Article Evaluation Procedure*



A systematic review was conducted to examine the utilization of digital games in the context of foreign language learning. The search process encompassed four databases, namely EBSCO, Scopus Springer, Elsevier, and Web of Science, employing a range of keywords associated with the research topic. The initial search yielded 145 articles, which underwent a thorough evaluation to determine their relevance to the research question. Following a detailed examination of the abstracts and summaries of the 140 articles, 84 were excluded due to their lack of alignment with English education or their divergence from the specified topic area. Consequently, a final set of 56 articles was selected for coding and analysis.

The primary aim of this systematic review was to present a comprehensive overview of the existing literature concerning the use of digital games in foreign language learning. The search process employed rigorous procedures, encompassing multiple databases and employing pertinent keywords to ensure the inclusion of a wide range of relevant articles. The subsequent screening and selection process further refined the focus, identifying articles that directly addressed the research question. The resulting sample of 56 articles represents a robust and comprehensive compilation of current research on this subject matter, serving as the foundation for the subsequent analysis and interpretation of the findings.

Data Collection and Analysis

The data extracted from the selected 56 articles were subjected to a comprehensive analysis aimed at identifying common themes and patterns in the utilization of digital games in the context of foreign language learning. The coding process involved a meticulous reading of each article, with categorization conducted based on the research questions addressed. The coded data were subsequently subjected to frequency analysis to determine the prevailing aspects discussed concerning digital game-based foreign language learning. The findings of the data analysis revealed that digital games can serve as effective tools for facilitating foreign language learning.

Among the reviewed articles, 40 addressed the positive impacts of employing digital games in foreign language learning, highlighting improvements in language skills, heightened

motivation and engagement, and enhanced cultural awareness. Additionally, 35 articles explored the various types of digital games utilized in foreign language learning, encompassing role-playing games, simulation games, puzzle games, and other genres. Collectively, the data analysis furnished a comprehensive overview of the implementation of digital games in foreign language learning, shedding light on their potential benefits and design considerations. The outcomes of this study contribute to the existing body of research on digital game-based foreign language learning, offering valuable insights for future investigations and practical applications in this domain. To ensure consistency in the interpretation of codes, the content analysis was conducted by two academics possessing comparable academic backgrounds and expertise in digital game-based foreign language learning (DGBLL). The research team, led by a seasoned university professor with a decade of teaching, research, and publishing experience, included a fourth-year English teacher from a DGBLL research group and a graduate student.

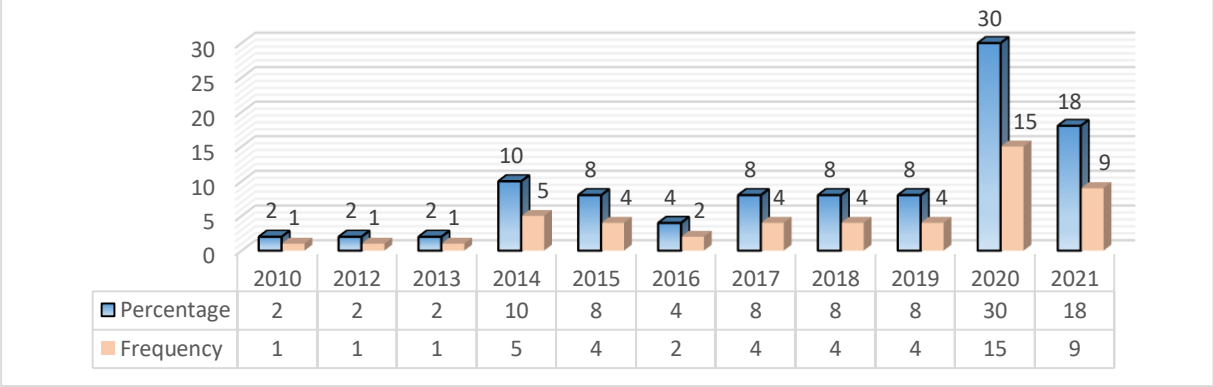
The reliability of the coding process was determined to be 91% using the formula Reliability = Number of Overlap / (Number of Overlap + Number of Non-Overlap), with a recommended minimum of 80% reliability (Miles & Hubermann, 1994). The coding criteria were established following the study's objectives, and the results were thoroughly analyzed, employing techniques such as frequency counts, percentage calculations, and visual representations. Moreover, a grounded approach was adopted to derive variables from the existing literature, drawing upon the works of Kazu and Issaku (2020) and Neuendorf (2017). The research team identified experimental studies that employed frameworks or models to elucidate the characteristics of learning games, as well as investigations focusing on different educational levels. Through a constant comparative technique, articles were continually assessed until theoretical saturation was achieved (Bowen, 2008). The identified characteristics were conceptually classified, yielding results encompassing three descriptive features and seven study topics.

Results

The Descriptive Characteristics of the Studies

Regarding the descriptive features of the included studies, the outcomes regarding publication year, researcher gender, and education level are presented below in terms of frequency, percentage, and graphical representations. The distribution of the studies based on publication years is visually depicted in Figure 3.

Figure 3. *Distribution of Studies by Publication Years*

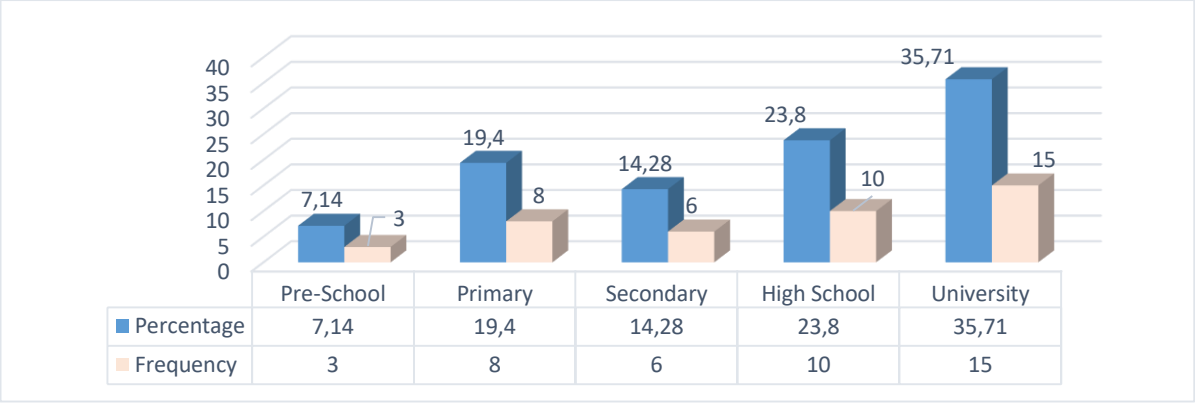


	2010	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Percentage	2	2	2	10	8	4	8	8	8	30	18
Frequency	1	1	1	5	4	2	4	4	4	15	9

The findings indicate that the majority of studies on DGBLL were conducted in the year 2020, accounting for 30% of the total studies included in the analysis. On the other hand, the years between 2010 and 2013 had the lowest representation, with only 2% of the studies being conducted during each of those years.

This distribution suggests a growing interest in DGBLL in recent years, particularly in 2020, possibly indicating an increased recognition of the potential benefits and effectiveness of digital games in foreign language learning. The limited number of studies conducted in the earlier years could be attributed to a relatively nascent stage of research and exploration in the field during that period. However, it is important to consider that this interpretation is based on the available data and may be subject to further investigation and analysis. The analysis of researcher gender in the studies conducted on DGBLL over the last 11 years reveals that 52.6% (n=72) of the researchers were women, while 47.4% were men. This indicates a relatively balanced distribution in terms of gender representation among researchers in the field of DGBLL. Regarding the distribution by education level, further details are provided in Figure 5, which illustrates the breakdown of studies based on different educational levels. However, without the specific information from Figure 4, it is not possible to comment on the findings related to the distribution by education level. Please refer to Figure 4 for a comprehensive understanding of the distribution patterns. It is worth noting that gender representation and education level are important factors to consider in research, as they can influence perspectives, experiences, and the overall diversity of the research community. The balanced gender distribution in the studies reflects a positive trend toward inclusivity and representation in the field of DGBLL research.

Figure 4. *Distribution by Education Levels*



	Pre-School	Primary	Secondary	High School	University
Percentage	7,14	19,4	14,28	23,8	35,71
Frequency	3	8	6	10	15

The findings indicate that a significant proportion of studies on DGBLL focus on the university level, accounting for 35.71% of the total studies. This suggests that there is a considerable emphasis on utilizing digital games for foreign language learning in higher education settings. The higher representation of university-level studies may be attributed to the increased availability of resources, technological infrastructure, and the recognition of the potential benefits of DGBLL in higher education institutions. On the other hand, the relatively lower number of studies in the preschool period, comprising only 7.14% of the total, highlights a potential gap in research focusing on digital game-based foreign language learning for young learners. This finding suggests that more attention could be given to exploring the effectiveness and appropriate implementation of DGBLL strategies in early childhood education.

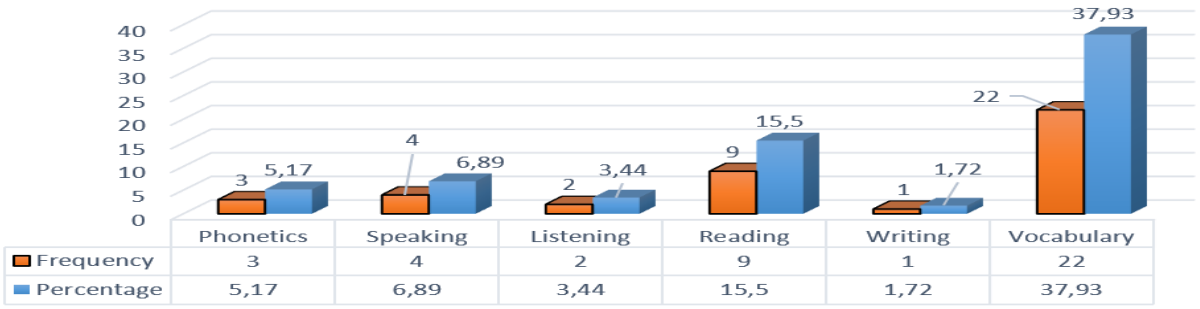
In summary, the distribution of studies across different educational levels underscores the importance of considering the specific needs, characteristics, and developmental stages of learners when designing and implementing DGBLL interventions. Future research efforts

should aim to bridge the gap by further investigating the potential benefits and challenges of using digital games for foreign language learning in various educational contexts, including preschool settings, to promote a comprehensive understanding of DGBLL's impact across different age groups.

The Findings of the Work Areas

In this part of the research, the findings obtained from the studies included in the content analysis are respectively; research subject areas, language skills areas, research methods, data collection tools, sample levels, data analysis methods, and data analysis results are presented as frequency, percentage, and graphic. The distribution of the studies according to language skill areas is given in Figure 5.

Figure 5. *Subject Distribution by Foreign Language Skills*



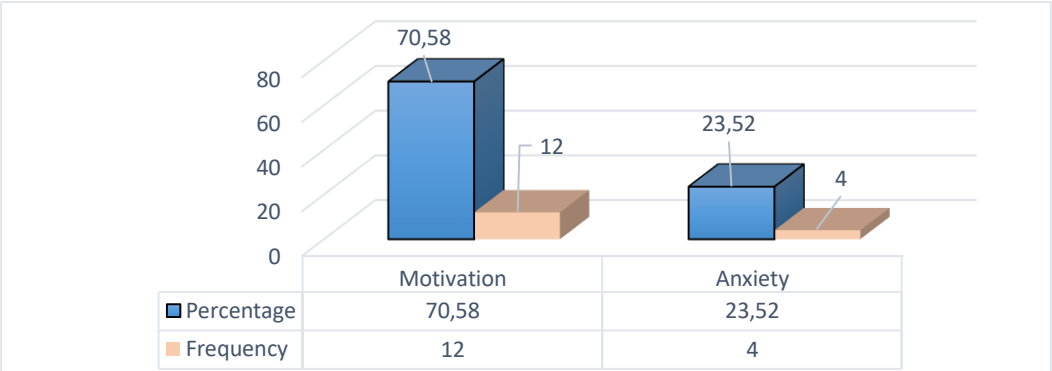
	Phonetics	Speaking	Listening	Reading	Writing	Vocabulary
Frequency	3	4	2	9	1	22
Percentage	5,17	6,89	3,44	15,5	1,72	37,93

The data presented in Figure 5 indicate that the majority of studies on DGBLL focus on the word level, with a frequency of 41 and comprising 37.93% of the total studies. This suggests that there is a strong emphasis on investigating the effectiveness of digital games in enhancing learners' vocabulary acquisition and word-level proficiency in foreign language learning contexts. On the other hand, the findings reveal that there is a relatively lower number of studies specifically targeting writing skills, with only two studies accounting for 1.72% of the total. This observation highlights a potential gap in the literature concerning the use of digital games to improve learners' writing abilities in foreign language learning. It suggests that further research is needed to explore the potential benefits, challenges, and effective strategies for incorporating digital games in enhancing writing skills.

Considering the importance of developing well-rounded language skills, it is crucial to address the imbalance in research focus between the word level and writing skills. Future studies should aim to investigate and identify innovative approaches, game mechanics, and pedagogical strategies that effectively integrate digital games to support learners' writing proficiency in foreign language learning settings. Furthermore, the findings underscore the need for more comprehensive research endeavors that encompass a broader range of language skills in DGBLL, including not only vocabulary but also speaking, listening, reading, and writing. By addressing these gaps, researchers can contribute to a more holistic understanding of the potential benefits and effective implementation of digital games in fostering language development across multiple skill domains.

The frequency-percentage table for the studies conducted according to the motivation and anxiety status in the second category is shown in Figure 6.

Figure 6. *Studies on Motivation and Anxiety*



Upon analyzing the presented figure, it is evident that the total frequency of studies in the field of DGBLL is 16. Among these studies, a significant proportion of research efforts, accounting for 70.58 percent, have been dedicated to investigating the impact of digital games on motivation in foreign language learning. This focus on motivation highlights the recognition of its crucial role in enhancing learners' engagement, persistence, and overall language learning outcomes within the context of digital game-based approaches. Additionally, the figure reveals that 23.52 percent of the studies have examined the relationship between DGBLL and anxiety. This finding suggests that researchers have recognized the potential influence of digital games on learners' anxiety levels during language learning activities. Exploring this aspect is valuable, as addressing anxiety can contribute to creating a supportive and conducive learning environment that promotes learners' confidence and reduces potential barriers to language acquisition.

The emphasis on motivation and anxiety in the reviewed studies indicates the acknowledgment of these psychological factors as important considerations when designing and implementing DGBLL interventions. By addressing motivation and anxiety, researchers and educators can effectively promote learners' positive attitudes, engagement, and emotional well-being, ultimately facilitating more effective foreign language learning experiences. It is worth noting that while motivation and anxiety are crucial aspects to investigate in the DGBLL context, future research should also explore other relevant factors such as cognitive processes, language proficiency development, and socio-cultural considerations. By examining a broader range of variables, researchers can gain a more comprehensive understanding of the multifaceted effects and implications of DGBLL in foreign language learning.

According to the data obtained, it is evident that quantitative research has been the most commonly employed method in studies on DGBLL, accounting for 56% (n=28) of the total studies. This preference for quantitative research reflects the inclination of researchers to gather and analyze numerical data to investigate the effectiveness and impact of digital games in foreign language learning. Quantitative research allows for the measurement and statistical analysis of variables, enabling researchers to establish correlations, trends, and generalizable findings. On the other hand, the utilization of qualitative research methods in DGBLL studies is comparatively lower, representing 22% (n=11) of the total studies. Qualitative research methods are valuable for exploring learners' experiences, perceptions, and in-depth understanding of the complex dynamics and nuances of DGBLL. Qualitative approaches, such as interviews, observations, and focus groups, provide rich and detailed insights into learners' perspectives, motivations, and learning processes, offering a deeper understanding of the phenomenon under investigation. Interestingly, the findings reveal an equal number of studies employing mixed methods (n=11) as those using qualitative methods (n=11). The utilization of mixed methods signifies researchers' recognition of the value of combining quantitative and

qualitative approaches to capture a more comprehensive understanding of DGBLL. By integrating both quantitative and qualitative data, researchers can gain a more holistic view of the subject, incorporating numerical data as well as rich qualitative insights.

The distribution of research methods in the DGBLL studies indicates the diverse approaches employed to explore the multifaceted nature of digital game-based foreign language learning. While quantitative research offers valuable quantitative data and statistical analysis, qualitative research and mixed methods bring in-depth contextual understanding and nuanced perspectives. It is essential to consider that the choice of research method should align with the research questions, objectives, and the nature of the phenomenon being investigated. Each research method has its strengths and limitations, and selecting the appropriate method or employing a combination of methods should be determined by the research goals and the research context.

According to the data, it is evident that achievement tests are the most commonly used data collection tool in studies investigating the effects of digital games on language learning in the context of DGBLL, accounting for 50% (n=28) of the total studies. Achievement tests are standardized assessments that measure learners' language proficiency and skills, allowing researchers to gather quantitative data on learners' performance and progress. These tests provide objective and comparable measures of language learning outcomes, enabling researchers to evaluate the effectiveness of digital games in improving language proficiency. On the other hand, interviews are the least utilized data collection tool in the examined studies, representing 7.1% (n=4) of the total studies. Interviews involve direct interactions with participants, allowing researchers to gather qualitative data on learners' experiences, perceptions, and attitudes toward DGBLL. Through interviews, researchers can gain in-depth insights into learners' perspectives, motivations, and challenges related to using digital games for language learning. While interviews require more time and resources to conduct, they offer valuable qualitative data that enriches the understanding of the impact and experiences associated with DGBLL.

It is important to note that different data collection tools offer distinct advantages and limitations. Achievement tests provide standardized and quantifiable measures of language learning outcomes, facilitating comparisons and statistical analysis. On the other hand, interviews offer subjective and contextual insights, allowing researchers to explore the individual experiences and nuances of language learners concerning digital games. The data presented in the analysis indicate that the primary school level had the highest average sample size (n=131) among the education levels examined in studies on DGBLL. This suggests that a significant number of studies focused on investigating the effects of digital games on language learning in primary school settings. The primary school level is crucial in language acquisition, as it lays the foundation for language skills development.

In contrast, the high school level had the lowest average sample size (n=49) among the education levels studied. This indicates that fewer studies specifically targeted high school students in the context of DGBLL. It is worth noting that high school students may have different needs, motivations, and learning experiences compared to younger learners, which could contribute to the lower sample size at this level. Regarding the distribution of studies according to education levels, it was found that the university level had the highest frequency (f=9) of sampled studies. This suggests that a considerable number of studies focused on digital game-based foreign language learning in university settings. This could be due to the availability of resources, research opportunities, and a higher level of autonomy among university students. On the other hand, the preschool level had the lowest frequency (f=3) of sampled studies, indicating that fewer studies have targeted this age group in the context of DGBLL. This could be attributed to factors such as the limited availability of digital game-

based interventions specifically designed for pre-schoolers and the challenges associated with conducting research with young children.

The analysis of the data revealed that the questionnaire was the most commonly used data analysis method, accounting for 30.4% of the studies in DGBLL. This indicates that researchers frequently employed questionnaires to collect and analyze data related to digital game-based foreign language learning. Questionnaires are commonly used to gather self-reported information from participants, allowing researchers to assess various aspects such as attitudes, perceptions, and preferences. In contrast, less frequently used data analysis methods included frequency analysis, meta-analysis, and non-parametric tests, each accounting for only 1.8% of the studies. Frequency analysis involves examining the occurrence and distribution of specific variables or categories within a dataset. A meta-analysis, on the other hand, involves synthesizing the results of multiple studies to draw overall conclusions. Non-parametric tests are statistical tests that do not assume a specific distribution of data. The lower utilization of these methods may be due to various factors, including the nature of the research questions, the type of data collected, or the specific focus of the studies included in the analysis. It is important to note that the choice of data analysis method depends on the research objectives, the type of data collected, and the research design employed. Researchers should carefully select the most appropriate analysis method that aligns with their research questions and the characteristics of their data.

The results indicate that a majority of the studies on the effect of digital game-based foreign language learning (DGBLL) on learners were successful, accounting for 93.6% of the total studies analyzed. This suggests that incorporating digital games into foreign language learning has generally yielded positive outcomes for learners. On the other hand, a smaller proportion of the studies, representing 6.4% of the total, reported unsuccessful outcomes. These findings suggest that in some cases, the implementation of DGBLL did not lead to the desired or expected results in terms of language learning outcomes. It is crucial to consider various factors that may contribute to the success or lack thereof in DGBLL studies, such as the specific design and implementation of the digital games, the characteristics of the learners, the instructional methods employed, and the context in which the studies were conducted. The reasons for the varying levels of success or failure in these studies could be multifaceted and may require further investigation.

Discussion

This study's findings underscore the potential advantages of digital games in foreign language education. Through the analysis of 56 articles, we observed that digital games could effectively boost language skills, increase learner motivation and engagement, and foster cultural awareness (Zeiss & Isabelli-García, 2005). This aligns with previous studies that consider games as an enjoyable, engaging learning tool promoting learner persistence (Anastasiadis et al., 2018). Moreover, the study underlines the role of game design in foreign language learning. 26 articles underscored design elements, like clear objectives, immediate feedback, and authentic language use (Kiili, 2005), that enhance game effectiveness. These features reflect game-based learning principles, which advocate for games offering meaningful and challenging tasks in line with learning goals (Lameras et al. 2017). However, the study also highlights some limitations and challenges. For instance, digital games may not suit all learners, particularly those less technologically inclined or less familiar with digital games (Licorish et al. 2018). Furthermore, the effectiveness may vary depending on the game type and specific language skills targeted (Acquah & Katz, 2020). Despite these challenges, the study presents compelling evidence supporting the use of digital games in foreign language education. Hence, it is crucial for researchers and practitioners to further explore this field, identifying best

practices for the design and implementation of digital game-based language programs (Yang et al. 2021).

In response to the research questions posed, the latest findings offer several conclusions. First, the incorporation of digital games has demonstrated considerable potential for boosting vocabulary acquisition and enhancing proficiency at the word level. Additionally, investigations into the effectiveness of digital games have revealed a positive impact on the development of critical language skills, including speaking, listening, reading, and writing. Notably, there is mounting evidence supporting the positive effect of digital games on learners' motivation and engagement levels in the context of foreign language acquisition. Moreover, studies are beginning to highlight the correlation between digital game-based learning and learners' anxiety levels, emphasizing the potential of games to facilitate a less stressful learning environment. The research conducted on this subject has been broad in scope, with researchers applying a variety of methodologies, encompassing quantitative, qualitative, and mixed methods research approaches, to gain a comprehensive understanding of the phenomena. To ensure the validity and reliability of the findings, a wide range of data collection tools has been employed, including achievement tests, interviews, and questionnaires. Furthermore, the universal applicability and adaptability of digital game-based language teaching have been shown, as studies have explored a broad spectrum of educational contexts, ranging from primary schools to universities.

This study's findings highlight that digital games are a popular tool for foreign language education at universities, accounting for 35.71% of the studies. Various data collection methods, including tests, interviews, and questionnaires, have been used, suggesting a holistic approach to evaluating this teaching method. It is evident from larger sample sizes in primary school studies that there's growing interest in using digital games for language learning among younger learners. Questionnaires were the most preferred data analysis method, signifying the importance of learners' views. The high success rate of 93.6% reaffirms digital games as effective language-learning tools. In summary, there's a rising interest in using digital games for language education, particularly at universities, with diverse data collection and analysis techniques underpinning a comprehensive understanding of this approach's impact. The findings affirm digital games' potential to improve language skills, boost engagement, and enhance cultural awareness. However, the game design and learners' specific needs should be considered when implementing such programs. Further research is needed to explore this and identify best practices (Kazu & Kuvvetli, 2021).

Our study on digital game-based foreign language learning diverges from prior studies in its broader scope and methodology. Unlike previous studies focused mainly on vocabulary acquisition, our research offers a comprehensive analysis of various skill areas, including reading, writing, listening, and vocabulary, filling a gap in the literature. The study utilizes the embedded theory design for a nuanced examination of these skills across diverse settings globally, aiming to provide a holistic understanding of the topic. We've reviewed literature from 2010 to 2021 for a current perspective on trends and developments in the field, with the intent to spot gaps and opportunities for further research. Our unique approach extends the existing literature, and we believe that our detailed analysis will provide valuable insights for stakeholders in this field.

Limitations

This study has several limitations. Firstly, it analyzed articles from only four databases and only in English, potentially missing other important research in digital game-based foreign language education. Secondly, the review was limited to summary portions of articles, possibly omitting key information. The subjective nature of the coding process may have also introduced biases,

despite efforts to mitigate this with a standardized protocol and double coding. Lastly, the study examined articles published until 2021, which may not capture the latest research in this rapidly evolving field. While the study's findings offer insights into digital games' role in language education, these limitations need consideration, and further research is needed to fully understand the potential of digital games in this context.

Conclusions

This research carried out comprehensive research on digital game-based foreign language education, and primarily the descriptive features of the studies were taken into account. For this reason, firstly, the distribution of the study by years was examined, and as a result, it was proved that the use of digital games in the field of language education increased in recent years with the development of technology together with the game world, the increase in the variety of digital games, and the increase in investments on digital games (Hamizul & Rahimi, 2021). Apart from this, it was determined that female researchers have done more research on this subject.

High-quality scoping research begins with a thorough search. The present research explored four widely used databases and uncovered over 100 papers, resulting in a thorough evaluation. Additionally, past studies have not paid sufficient attention to the characteristics/elements of DGBLL, which seem to be essential areas for both study and practice aimed at improving DGBLL. By studying current digital games for language learning using game design criteria, researchers may determine their quality and investigate their features while taking into account other factors such as language learning goals, educational level, and language competency level.

As a result of the examinations made according to education levels, it can be suggested to include more studies in the field of preschool, secondary school, and primary school to eliminate the deficiency in the subject of DGBLL in the literature. In addition, considering the frequency and percentage results of the sub-topics related to the acquisition of English skills, it can be concluded that the most gaps in DGBLL in the literature are in writing skills, followed by listening, pronunciation (phonetics), speaking, and reading skills. In addition, when the data obtained from studies on motivation and anxiety states are examined, it can be concluded that DGBLL has an interesting feature in students who mostly participate in game-based foreign language education.

When the distribution of the studies according to the method types and the situations of the data collection tools were examined, it was found that the quantitative studies mostly wanted to measure the effects of the DGBLL on the learners with the achievement tests, and it was seen that it was desired to obtain findings of the success of the students. In addition, when the sample levels are examined in the studies, it can be deduced that more opinions about DGBLL are desired to be obtained by selecting the highest sample level in qualitative studies.

Consequently, when the results of many qualitative, quantitative, and mixed studies on DGBLL were analyzed, it was found that DGBLL played a successful role in learning in most of the studies, and it was learned that it was an effective method for learners. When the data is examined in general, it is seen that there is an important gap in the literature on DGBLL, especially in the development of language skills. When the historical developments of the games are examined in the context of the conceptual framework (Benson & Chik; Cornillie et al. 2012; 2011; Peterson, 2013; Reinders, 2012; Reinhardt & Sykes, 2012; Reinders & Wattana, 2012; Sykes et al. 2008; Sykes, 2017), it is seen that the DGBLL researches are mostly at the word level. However, expanding this research to include additional skill areas and determining how successful DGBLL is in language acquisition areas can contribute to the literature.

Disclosure Statement

No potential conflict of interest was reported by the authors.

References

Acquah, E. O., & Katz, H. T. (2020). Digital game-based L2 learning outcomes for primary through high-school students: A systematic literature review. *Computers & Education*, *143*, 103667. https://doi.org/10.1016/j.compedu.2019.103667

Allen, L. K., Crossley, S. A., Snow, E. L., & McNamara, D. S. (2014). L2 writing practice: Game Enjoyment as a key to engagement. *Language Learning & Technology*, *18*(2), 124-150.

Anastasiadis, T., Lampropoulos, G., & Siakas, K. (2018). Digital game-based learning and serious games in education. *International Journal of Advances in Scientific Research and Engineering*, *4*(12), 139-144. https://doi.org/10.31695/IJASRE.2018.33016

Benson, P., & Chik, A. (2011). Towards a more naturalistic call: video gaming and language learning. *International Journal of Computer-Assisted Language Learning and Teaching*, *1*(3),1-13. https://doi.org/10.4018/ijcallt.2011070101

Bowen, G. A. (2008). Naturalistic inquiry and the saturation concept: a research note. *Qualitative Research*, *8*(1), 137-152. https://doi.org/10.1177/1468794107085301

Bozkurt, A., Akgun-Ozbek, E., Yilmazel, S., Erdogdu, E., Ucar, H., Guler, E., & Dincer, G. D. (2015). Trends in distance education research: A content analysis of journals. *International Review of Research in Open and Distance Learning*, *16*(1), 330-363. https://doi.org/10.19173/irrodl.v16i1.1953

Cornillie, F., Thorne, S. L., & Desmet, P. (2012). *ReCALL special issue: Digital games for language learning: Challenges and opportunities: Editorial Digital games for language learning: From hype to insight? ReCALL Journal]*, *24*(3), 243-256. https://doi.org/10.1017/S0958344012000134

Cornillie, F., Van Den Noortgate, W., Van den Branden, K., & Desmet, P. (2017). Examining focused L2 practice: From in vitro to in vivo. *Language Learning & Technology*, *21*(1), 121-145.

Ebrahimzadeh, M. (2017). Readers, players, and watchers: EFL students' vocabulary acquisition through Digital Video Games. *English Language Teaching*, *10*(2), 1-18. https://doi.org/10.5539/elt.v10n2p1

Gee, J. P. (2007). *What video games have to teach us about learning and literacy* (2nd ed.). Palgrave Macmillan.

Hamizul M. & Rahimi N. M. (2015). Design and development of Arabic online games: A conceptual paper. *Procedia- Social and Behavioral Sciences*, *174*(1), 1428-1433. https://doi.org/10.1016/j.sbspro.2015.01.771

Hubbard, P. (1991). Evaluating computer games for language learning. *Simulation and Gaming*, *22*(2), 220-223. https://doi.org/10.1177/1046878191222006

Hwang, W., Shih, T. K., Ma, Z., Shadiev, R., & Chen, S. (2016). Evaluating listening and speaking skills in a mobile game-based learning environment with situational contexts. *Computer Assisted Language Learning*, *29*(4), 639-657. https://doi.org/10.1080/09588221.2015.1016438

Jalali, S., & Dousti, M. (2012). Vocabulary and grammar gain through computer educational games. *GEMA Online® Journal of Language Studies*, *12*(4), 1077-1088.

Jensen, S. H. (2017). Gaming as an English language learning resource among young children in Denmark. *CALICO Journal*, *34*(1), 1-19. https://doi.org/10.1558/cj.29519

Kazu, İ. Y., & Issaku, Y. (2020). English language teaching students' perceptions on the concept of flipped classroom in teaching English: a metaphoric study. *Elektronik Eğitim Bilimleri Dergisi*, *9*(17), 72-88.

Kazu, İ. Y., & Kurtoğlu, C. (2022). An investigation of secondary school teachers' flipped classroom readiness. *South African Journal of Education*, *42*(1), 1-11. https://doi.org/10.15700/saje.v42n1a2020

Kazu, İ. Y., & Kuvvetli, M. (2021). *Students' metaphorical perceptions on the concept of digital game-based education*. Virtually Hosted, Florida, USA.

Kessler G. (2018). Technology and future of language teaching. *Foreign Language Annals*, *51*(1), 205-218. https://doi.org/10.1111/flan.12318

Kiili, K. (2005). Digital game-based learning: Towards an experiential gaming model. *The Internet and Higher Education*, *8*(1), 13-24. https://doi.org/10.1016/j.iheduc.2004.12.001

Klimova, B., & Kacet, J. (2017). Efficacy of computer games on language learning. *Turkish Online Journal of Educational Technology-TOJET*, *16*(4), 19-26.

Kohnke, L. (2021). GoSoapBox – Encourage participation and interaction in the language classroom. *RELC Journal*, *52*(3), 648-650. https://doi.org/10.1177/0033688219872570

Kohnke, L., & Moorhouse, B. L. (2021). Using kahoot! To gamify learning in the language classroom. *RELC Journal*, *53*(3), 769-775. https://doi.org/10.1177/00336882211040270

Krashen, S. D. (1982). *Principles and Practice in Second Language Acquisition.* Pergamon.
Krippendorff, K. (1980). *Content analysis: An Introduction to its Methodology* (3rd ed.). Sage.
Lameras, P., Arnab, S., Dunwell, I., Stewart, C., Clarke, S., & Petridis, P. (2017). Essential features of serious games design in higher education: Linking learning attributes to game mechanics. *British Journal of Educational Technology*, *48*(4), 972-994. https://doi.org/10.1111/bjet.12467
Licorish, S. A., Owen, H. E., Daniel, B., & George, J. L. (2018). Students' perception of Kahoot!'s influence on teaching and learning. *Research and Practice in Technology Enhanced Learning*, *13*(1), 1-23. https://doi.org/10.1186/s41039-018-0078-8
Lucht, M., & Heidig, S. (2013). Applying HOPSCOTCH as an exer-learning game in English lessons: two exploratory studies. *Educational Technology Research and Development*, *61*(5), 767-792. https://doi.org/10.1007/s11423-013-9308-3
McGonigal, J. (2013). *Reality is Broken: Why games make us better and how they can change the world.* The Penguin Group.
Mehrpour, S., & Ghayour, M. (2017). The effect of educational computerized games on learning English spelling among Iranian children. *The Reading Matrix: An International Online Journal*, *17*(2), 165-178.
Miles, M. B., & Huberman, A. M. (1994). *Qualitative data analysis: An expanded sourcebook.* Sage.
Moorhouse, B. L. & Kohnke, L. (2020). Using mentimeter to elicit student responses in the eap/esp classroom. *RELC Journal*, *51*(1), 198-204. https://doi.org/10.1177%2F0033688219890350.
Mustika M., Sari M. L., Kao C. & Heh J. (2014). Digital BINGO game as a dynamic assessment in a reading instruction for learning Indonesian as a foreign language: A system architecture. *IEEE 14th International Conference on Advanced Learning Technologies*, Atina. https://doi.org/10.1109/ICALT.2014.233.
Nadolny L., Valai A., Cherrez J. N., Elrick D., Lovett, A., & Nowatzke M. (2020). Examining the characteristics of game-based learning: A content analysis and design framework. *Computers & Education*, *156*(1), 103936 https://doi.org/10.1016/j.compedu.2020.103936
Neuendorf, K. A. (2017). *The content analysis guidebook* (2nd ed.). Sage.
Pavlenko, A., & Lantolf, J. P. (2000). Second language learning as participation and the (Re)construction of selves. In J. P. Lantolf (Ed.), *Sociocultural theory & second language learning* (pp.155-177). Oxford University Press.
Peterson, M. (2012). Efl learner collaborative interaction in Second Life. *ReCALL*, *24*(1), 20-39. https://doi.org/10.1017/S0958344011000279
Peterson, M. (2013). *Computer games and language learning.* Palgrave Macmillan.
Phillips, M. (1987). Potential paradigms and possible problems for call. *System*, *15*(1), 275-287. https://doi.org/10.1016/0346-251X(87)90002-9
Poole, F. J., & Clarke-Midura, J. (2020). A systematic review of digital games in second language learning studies. *International Journal of Game-Based Learning (IJGBL)*, *10*(3), 1-15. https://doi.org/10.4018/IJGBL.2020070101
Reinders, H. (Ed.). (2012). *Digital games in language learning and teaching.* Palgrave Macmillan.
Reinders, H., & Wattana, S. (2012). Talk to me! Games and students' willingness to communicate. In H. Reinders (Ed.), *Digital games in language learning and teaching* (pp. 156-188). Palgrave Macmillan.
Reinhardt, J., & Sykes, J. (2012). Conceptualizing digital game-mediated L2 learning and pedagogy: Game-enhanced and game-based research and practice. In H. Reinders (Ed.), *Digital games in language learning and teaching* (pp. 32-39). Palgrave Macmillan.
Roslina İ., & Azizah J. (2008). *Web-based educational games as a learning tool: Issues and challenges on design and development perspective in Malaysia.* (pp. 421-432). Proceeding in the 4th International Conference on University Learning and Teaching, Malaysia.
Shih, M., Feng, J., & Tsai, C. C. (2008). Research and trends in the field of e-learning from 2001 to 2005: A content analysis of cognitive studies in selected journals. *Computers & Education*, *51*(2), 955-967. https://doi.org/10.1016/j.compedu.2007.10.004
Squire, K. D. (2009). Mobile media learning: multiplicities of place. *Horizon*, *17*(1), 70-80. https://doi.org/10.1108/10748120910936162
Sykes J. M. (2017). Digital games and language teaching and learning. *ACTFL*, *51*(1), 219-224. https://doi.org/10.1111/flan.12325
Sykes, J.M., & Reinhardt, J. (2012). *Language at play: Digital game-mediated foreign language teaching and learning.* Pearson.
Sykes, J., Oskoz, A., & Thorne, S. L. (2008). Web 2.0, synthetic immersive environments, and the future of language education. *CALICO Journal*, *25*(1), 528-546. https://doi.org/10.1558/cj.v25i3.528-546

Tang, S., Hanneghan, M., & El Rhalibi, A. (2009). Introduction to games-based learning. In T. Connolly, M. Stansfield, & L. Boyle (Eds.), *Games-based learning advancements for multi-sensory human computer interfaces: Techniques and effective practices* (pp. 1-17). IGI Global. https://doi.org/10.4018/978-1-60566-360-9.ch001

Wang AI. & Tahir R. (2020). The effect of using Kahoot! For learning – A literature review. *Computers & Education, 149*(1), 1-22. https://doi.org/10.1016/j.compedu.2020.103818

Yang, Y. F., Goh, A. P., Hong, Y. C., & Chen, N. S. (2021). Primary school students' foreign language anxiety in collaborative and individual digital game-based learning. *Computer Assisted Language Learning*. https://doi.org/10.1080/09588221.2021.2008979

Zawacki-Richter, O., & Latchem, C. (2018). Exploring four decades of research in Computers & Education. *Computers & Education*, *122*(1), 136-152. https://doi.org/10.1016/j.compedu.2018.04.001

Zeiss, E., & Isabelli-García, C. L. (2005). The role of asynchronous computer mediated communication on enhancing cultural awareness. *Computer Assisted Language Learning*, *18*(3), 151-169. https://doi.org/10.1080/09588220500173310

Copyrights