Review article

The use of video games in vocabulary acquisition: a short narrative review

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ABSTRACT

In the last few years, video games have started to become educational tools, particularly in language learning. Nevertheless, the usefulness of this method is often questioned. This article critically addresses their potential and effectiveness, focusing specifically on their ability to facilitate vocabulary learning with an emphasis on the teaching of English as a second language. Through a detailed analysis of a sample of the existing literature, we explore both the substantial benefits and limitations inherent to the use of video games in diverse educational contexts. This analysis goes beyond a simple assessment of their utility, highlighting the ability of video games to generate interactive and emotional immersion. However, our review also addresses the associated complexities, from digital barriers to challenges in cultural adaptation. We conclude that games are useful allies for vocabulary acquisition and provide recommendations for future research. These include the long-term persistence of the acquired knowledge, the creation of inclusive video games, and the exploration of music as a facilitator of vocabulary learning.

Keywords: video games, language learning, vocabulary

1. Introduction

In the globalized, modern era, English proficiency has become a necessity. As technology evolves and transforms our lives, video games have risen as educational tools with the potential to revolutionize the way in which a new language is learned [1]. These games encourage critical thinking, problem-solving and quick decision making. Some games are specifically designed to teach academic abilities and concepts such as science and mathematics [2]. Additionally, they offer a unique immersive experience in which language becomes an integral part of the entertainment and exploration [3]. This interactive environment mixes amusement with learning, thus becoming particularly attractive for the

wide audience available in the growing digital world [4].

The ever-growing access to digital technology has brought on an avalanche of studies which explore the potential of video games and digital apps to improve linguistic abilities, especially reading and vocabulary skills [4]. Experts in the education and language fields have analyzed the efficacy of video games as learning tools for vocabulary, especially for students of English as a second language (ESL). This is due to the rich learning environment they provide from a linguistic standpoint [5]. Nevertheless, controversies requiring a greater analysis have arisen, as video games suffer from a bad reputation and are thus often discredited or dismissed as learning tools [2].

Therefore, this article aims to focus on the results

of these studies and analyze the ways in which video games can be useful allies to the learning process. In the post-pandemic world, after a rapid switch to online learning, it is of vital importance to know all the tools at the disposal of educators, as well as their possible benefits and any consequences. The efficacy of video games and all their visual and auditory assets as resources to increase vocabulary acquisition among ESL learners is the guiding question of this review.

Digital learning is a broad field that has grown and developed greatly in the past couple of years [2]. This paper centers on a select few articles dedicated to shine a light on the influence of video games on English vocabulary acquisition and retention, as well as any major discoveries. Through these pages, we will examine their contribution to education and language learning in great detail and provide insight as to their importance.

In Section 2, our inclusion and exclusion criteria will be discussed, providing a thorough walk-through of our selection process. In Section 3, we will outline the key findings of our selected papers. These will then be discussed in-depth in Section 4. Lastly, we will share final thoughts and takeaways in Section 5.

2. Methodology

The selection method employed in this review marks the reach and depth of our investigation. Our main search engines were Google Scholar and Semantic Scholar, both recognized and trustworthy sources used by experts. These platforms were chosen due to their complete indexation and their simple yet effective usability, which made them both adequate for extensive literature compilation.

Papers for this review were found through the keywords "video games", "vocabulary", "vocabulary skills" expressed in the complete search requests "use of video games in vocabulary learning", "impact of video games in ESL vocabulary skills" and "effects of video games in vocabulary acquisition". This yielded a total of 4,530 papers. Those unrelated to our topic were discarded by agreement between the coauthors. This reduced our sample pool to 307 possible texts. Our selection criteria was strict to guarantee a high quality standard. We only considered papers written in English and further limited our search to papers published in journals indexed within the Journal Citation Reports (JCR). We excluded journals indexed by JCR but classified as Q3 or Q4 within the Scimago catalog, as we aimed to work with the highest quality of papers in the field. Articles then had to reach a minimum of 5 citations per year to reflect their impact and recognition by academics.

In the beginning of our literature search, we were met with a substantial number of papers. Mendeley, a trustworthy reference management software, was used to exclude any duplicates. Papers were then filtered through our selection criteria. The aim was to extract only the most essential articles, taking their relevance into account. Additionally, each abstract was discussed by authors, and contentious disagreements were solved by vote; inclusion of a paper had to be unanimous. This method served to build a clear narrative around influential papers.

After a second read-through of abstracts, the 307 papers were reduced to 41. This sample was then refined by excluding those articles with a publication date further back than 2008 and non-indexed journals. This resulted in 27 articles. Eight more were excluded due to not meeting our citation per year requirement. One final article belonging to Q3 ranking was taken out of the sample after a mutual agreement between authors. The final sample consists of 18 articles considered to be the most relevant in the area.

This method, while efficient, has limits that may result in the omission of articles that at the moment of review did not meet our inclusion criteria. While our reduced number of papers allows us to have a simplified, focused narrative that centers on highlighting innovations in recent years, it is important to note that articles published in late 2022 and 2023 had fewer chances to reach our minimum citations requirement. This could mean some relevant discoveries are not discussed in this review. Therefore, it is highly recommended to carry out continuous and expansive research furthering on the topics this review covers. Despite these limitations, the methodology employed to collect our sample makes up a solid base for our thematic analysis and the critical evaluation and discussions that follow it.

3. Thematic Overview

The articles in this review feature a variety of aims and scopes. However, certain similarities exist between them which allows us to find and examine the trends of their fields. These common threads, as well as their goals and findings, are explored within this section. The select topics include the contributions of video games in vocabulary acquisition, the factors that affect the efficiency of video games as learning tools, and their limits and difficulties in application.

The effectiveness of video games in education is being explored. It is widely agreed upon that both players and spectators can recall vocabulary used in games, especially those focused on entertainment and adventure [4, 11]. These exert a positive influence in the incorporation of words and later recall [15]. The emotional connection and immersion fostered in an interactive environment have a significant role in this task, facilitating the process [13]. It has been highlighted that online learning has an emotional and motivational impact and that a correlation between enjoyment and learning capacity exists [11, 6]. This finding emphasizes the necessity to consider emotional factors when implementing educational video games. Games based on digital technology can often create a positive learning environment and, in some cases, surpass traditional learning methods [9].

Setting intentional learning goals leads to a higher retention rates among students [1]. It is necessary to ascertain that the video game in question is appropri-

Table 1. The final list of articles used in this review, including information for title, journal, year of publication and citation.

Title	Journal	Year	Citation
Are Games Effective Learning Tools? A Review of Educational Games	Educational Technology & Society	2018	[6]
Digital game-based second-language vocabulary learning and conditions of research designs: A meta-analysis study	Computer & Education Journal	2018	[5]
Digital game-based vocabulary learning: where are we and where are we going?	Computer Assisted Language Learning	2021	[7]
Educational games as stand-alone learning tools and their motivational effect on L2 vocabulary acquisition and perceived learning gains	British Journal of Educational Technology	2017	[1]
Entertainment Video Games for Academic Learning: A Systematic Review	Journal of Educational Computing Research	2022	[2]
Exploiting adventure video games for second language vocabulary recall: a mixed-methods study	Innovation in Language Learning and Teaching	2017	[8]
Exploring the Potential of Digital Game-Based Vocabulary Learning: A Systematic Review	Systems	2023	[9]
Gamification in mobile-assisted language learning: a systematic review of Duolingo literature from public release of 2012 to early 2020	Computer Assisted Language Learning	2021	[3]
Gamified learning in higher education: A systematic review of the literature	Computers in Human Behavior	2018	[10]
Investigating the Impact of Integrating Vocabulary Exercises Into an Adventure Video Game on Second Vocabulary Learning	Journal of Educational Computing Research	2021	[11]
Motivating EFL students: E-learning enjoyment as a predictor of vocabulary learning through digital video games	Cogent Education	2016	[12]
Readers, Players, and Watchers: EFL Students' Vocabulary Acquisition through Digital Video Games	English Language Teaching	2017	[13]
Second language (L2) gains through digital game- based language learning (DGBLL): A meta-analysis	Language Learning & Technology	2022	[14]
The Effect of Interactivity with a Music Video Game on Second Language Vocabulary Recall	Language Learning & Technology	2010	[4]
The Effect of Multiplayer Video Games on Incidental and Intentional L2 Vocabulary Learning: The Case of Among Us	Multimodal Technologies and Interaction	2021	[15]
The effectiveness of digital game-based vocabulary learning: A framework-based view of meta-analysis	Language Learning & Technology	2018	[16]
The impact of adventure video games on foreign language learning and the perceptions of learners	Interactive Learning Environments	2012	[17]
Video-game based instruction for vocabulary acquisition with English language learners: A Bayesian meta-analysis	Educational Research Review	2020	[18]
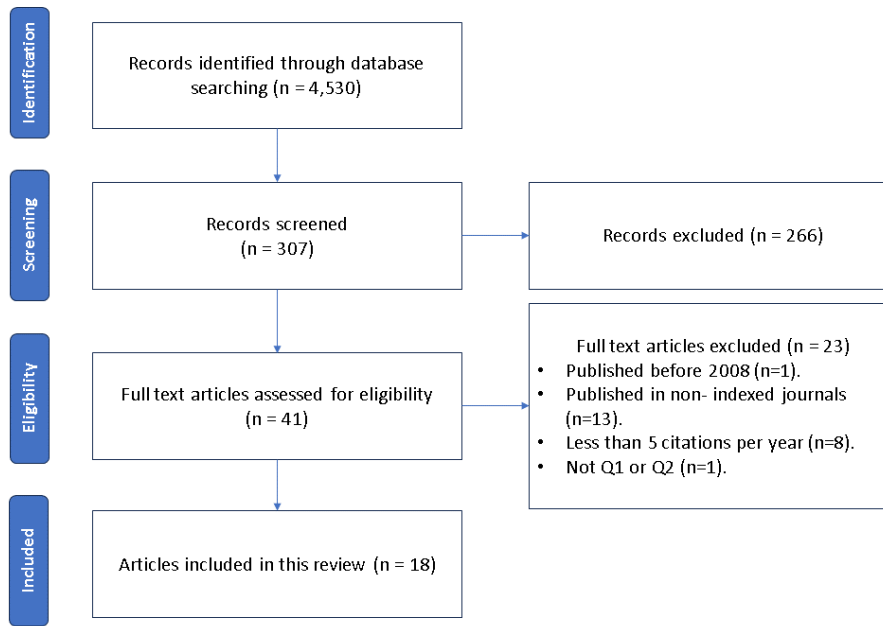
Figure 1. Selection process for the sample. Initial search engine results were then screened based on title before being put through our selection criteria. Final sample of articles consists of 18 texts.

ate for the student level and that it has the adequate focus [8, 4]. Games designed for entertainment maintain student motivation and engagement at a higher rate. Single-player games allow for an individualized, autonomous learning experience. Multi-player games, on the other hand, encourage collaboration and interaction between students which results in more community practice [15]. Both the user actively playing, the player role, and the user watching the game-play, the observer role, receive their own benefits [4]. The player is provided with a more entertaining, active learning experience, while the observer can learn from others and analyze their strategies [14].

Serious video games, designed especially for educational purposes, showcase a higher efficiency once applied to learning practices regarding a specif academic topic [2]. However, this may not apply to vocabulary learning, as adventure video games tend to stimulate and interest players more than serious video games, which require a more significant cognitive load [19, 20, 16]. Adding a narrative does not increase the efficiency of serious games as their inclusion does not contribute any significant benefits [21].

Video games increase motivation among students and reduce their stress when compared to a traditional classroom. They can also innovate language learning in corporate settings [7, 12]. Video game-based learning promotes autonomy, allows them to take decisions and lets them make mistakes without pressure from an authority or attention from peers [9]. While traditional vocabulary learning causes boredom [15], various stud-ies show that students have a positive attitude towards learning from video games [11, 8, 10]. This positive attitude improves memory [22]. However, it is possible for students to lose this motivation if the game requires a major cognitive load to play [9]. To avoid this, the use of lexical support tools is encouraged to facilitate the experience [11].

Game design is another key aspect to consider. Video games must be attractive and interesting. If the game is unattractive or does not generate any impact on the player, it will cause boredom and no learning will occur [3]. Game duration must also be taken into account, if a game is too long, it can generate exhaustion and result in poor short term memory [5]. Graphics and ease of use are all factors that influence the efficacy of the learning experience [9]. Likewise, the speed with which character speaks or text shows up onscreen and the availability of subtitles as support affects player interest [11]. Subtitles in particular are considered advantageous for students [8].

Music represents another motivational tool to aid in vocabulary retention [13]. Players and observers of a music video game have both been proven to retain vocabulary used within it [4]. The immersion born from a captivating soundtrack is associated with better listening, reading and a general improved attitude towards language learning [17]. Thus, music not only becomes a pedagogical support, but a way to encourage active student participation, creating a better learning environment [23]. The combination of these audio and visual elements with player interaction within music video

games is an integral part of ESL learning [18].

Video games must adapt to player culture, including situations, characters and cultural references to their daily life [18]. They must have an objective language and go beyond simply showing off the words of phrases of the target language. Instead, it is preferable for them to involve the player in conversations and scenarios that allow them to interact with, understand and apply the language in a practical and significant manner [13]. A target audience must be selected, taking the age and level of the students into account [24]. The intended setting —formal classrooms or informal sessions, for example— has to be selected too, as different focuses will be needed for each. Achieving cultural relevance and authentic representation while guaranteeing accessibility for a wider audience is a great yet necessary challenge in cultural adaptation [18, 7].

When using video games for vocabulary acquisition, it is imperative to consider all aspects of their implementation. The words that will be included and how they will be tested must be outlined clearly from the beginning. Exercises within the game itself are recommended to help in this process as they provide lexical support and are the key to motivating the students and keeping their interest. To maintain said motivation, the video game must be selected carefully. The type of game is the first important factor, after which the student level must be evaluated. Its attractiveness, relevance to the student's cultural context and the time available for play must also be taken into account. Having clear intentions when approaching game-based learning will result in better development, learning and retention.

4. Discussion

Video game-based learning represents a great advantage over traditional learning methods [11, 9]. However, it is necessary to consider aspects such as game focus, its cultural relevance and its design [3]. An effective implementation of games in language learning can only occur when differences between player style, ages and learning preferences are all taken into account [18]. Games offer a modern and attractive alternative for learning, but issues regarding the challenges of access and the technological gap must also be addressed [25, 26]. While the reviewed papers touch upon video games' efficiency, the question as to how to better adapt games to different learning contexts remains. In this section, we discuss the implications of our key findings and detail the limitations of current research, exploring possible areas for future development.

While incidental learning occurs in all aspects of education, such as reading, a deliberate, defined structure is the key to ensure the successful implementation of game-based learning [27, 9]. Digital learning often focuses on transmitting information to the student, but video games instead offer interactivity and entertainment [28, 4, 12]. They provide proper contextualization of the target words and naturally allow for repetition, which is essential in active learning [1, 29]. In this way,

the selected texts have underlined the positive effect of video games in language learning, but there are very few games that combine the learning experience with the game-play [11]. Instead, games are mostly used as a language learning tool, and recall exercises are implemented later [15, 8]. This may occur because this integration is only available to education professionals with programming experience or who are not using off-the-shelf commercial video games [11, 8]. So, even though video games are seemingly effective tools for education that cover several of its principles, the technological gap exists for teaching professionals too [26], limiting their reach.

Practical application of video game learning is further complicated by the need for a proper cultural adaptation that nevertheless still allows for a large audience to benefit from it [7]. This would mean adjusting scenarios, characters and cultural references within video games, prioritizing making them enjoyable and avoiding the exclusion of certain demographic groups. If this is guaranteed, video games with interesting story lines and high entertainment value can help increase motivation and encourage autonomy [11, 1, 13, 9]. These positive effects can help promote the creation of education policies which innovate the education field and improve upon student participation and commitment [13]. Challenges regarding the technological gap remain, but fostering digital learning may incite institutions to address these disparities [9]. This would require investing in the corresponding infrastructure and the creation of strategies wherein all students, regardless of location or economic class, have access to game-based learning [21].

While not directly covered by the articles in our selection, the ethical implications of integrating video games into learning environments must be discussed. Gamified learning brings up questions as to the privacy of the student, access equality and the possibility of creating inclusive experiences that still respect fundamental values [9]. Video games are a valuable tool, but their effect on educational policies remains unexplored. How current educational policies can be broadened to cover this development and any attempted misuse is yet to be seen.

Among the findings identified while developing this review, and comparing it with other relevant reviews included in our bibliography, it is widely agreed upon that video games have become enriching learning tools, and can help specifically in reading and vocabulary skills [4, 2]. Nonetheless, this cannot be achieved without the proper implementation. A key point is ensuring the video game is attractive without exaggerating its design [3]. The technology, music, sounds and subtitles all must cooperate to help, not hinder, the player [11, 8]. The environment must contribute a pleasant atmosphere to create an enjoyable learning environment [9].

Agreements on what video games must not do were also common. They must not be of too long a duration and provoke fatigue or saturate the player with information that creates a significant cognitive load [5, 4]. On

the contrary, they must ensure motivating students and exalting their achievements is a goal at every step [3]. Another general agreement is the importance of teacher support and the appropriate game for the student level of the class [1, 7]. Games alone are not enough, interaction between the group and repetition of target words is greatly encouraged for proper understanding [6, 15].

Despite applying strict criteria to guarantee the quality and relevance of the literature, the possibility of having inadvertently excluded studies with new, innovative findings exists. Furthermore, a gap exists in the year 2023, where most studies published within the year did not meet our selection criteria. These articles may have provided additional perspectives or updates. It is also of utmost importance to recognize that, the methodological quality of individual studies may vary. This aspect must be be addressed to avoid biased interpretations based on heterogeneous research [18]. Although there is ample evidence supporting the effectiveness of video games in vocabulary learning, most studies in this field focus on video games in general and their lexical impact, but few dig deeper into variations of their effectiveness based on specific aspects of a game [16, 7]. Additionally, no standardized evaluation methods exist, which makes comparisons between them difficult and limits our abilities to draw concrete, definitive conclusions as to the better implementation methods overall.

Although the positive influence of adventure video games in incorporating and later recalling vocabulary has been highlighted [11], it must be recognized that effectiveness may vary depending on the specific nature and academic content. In particular, when it comes to vocabulary acquisition, serious video games may not be as efficient as adventure video games, as the latter tend to be more stimulating and interesting for students [19, 20]. This observation highlights the need to consider context and the intended learning goals while selecting the game to be used in vocabulary learning. The variability of the effectiveness of video games depending on the game mode (single or multiplayer) and the lack of significant differences between the player and the observer [4, 11] suggest the need for more specific studies that tackle the benefits and limitations of each method.

The inclusion of music as a tool for acquiring fluency in another language, although supported by several studies [13], also has limitations. The majority of studies focus on lyrics to English songs, which may limit the generalizing of results to other linguistic contexts. The lack of consensus as to how to best evaluate the musical effects on vocabulary learning brings forth challenges for a clear synthesis of the results.

Regarding game design, the need for attractive and interesting games presents challenges [3]. The positive impact of video games in motivation and stress reduction could be conditional to this attractiveness and cognitive load of the game [9]. However, the lack of consensus between what characteristics make a video game attractive and educational raises questions about the universal application of these findings [5]. Likewise,

there is no general agreement on the ideal length of video games and the influence of technological factors highlights the need for specific considerations in each educational context [11]. The proper way of striking the balance between cultural authenticity and wide accessibility is another point of contention that limits the development of these findings [26].

While this review describes a narrative about the effectiveness of games and their impact in vocabulary acquisition and retention, it is fundamental to address and clarify our limitations in order for the field to advance towards more solid, universal conclusions that allow thorough integration into educational environments. A clear methodology and extensive consideration of the specific conditions are crucial to maximize the benefits of this innovative tool [11].

Due to the broad nature of this topic, several gaps within the available literature and unexplored areas still exist. Such areas include the long term impact of video games in vocabulary learning, and whether or not knowledge of the words learnt in these exercises persists overtime. Effects of gamified learning on academic success have not been thoroughly evaluated. While studies have been conducted across several cultures, more could yet be explored. Specifically, focusing on younger age groups or different socioeconomic classes could yield interesting findings where results may vary. Applying different game types to different cultures to find where preferences differ or coincide is another possible point of interest. Another one would be the use of video games in special needs education for specific disabilities, or the overlap between accessibility customization and effectiveness in language learning.

This review reveals the duality inherent to integrating video games in a learning context. While there are evident benefits, there exist crucial challenges when it comes to maximizing their potential. Addressing these challenges requires flexible, personalized strategies that have to also tackle the technological breach. The tension between amusement and learning emerges as another point of contention in the implementation of video games. It is essential to find the balance between an attractive game and an educational one to make any significant contribution to the students. This, and the application of games across different cultures and contexts in order to analyze their long-term effectiveness and other such variations, becomes incredibly important to overcome their current limitations and guarantee a global, fair application of this technology.

5. Conclusion

Although our review provides valuable insights into the use of video games in vocabulary acquisition, it is not without limitations. One of the challenges inherent in our review lies in the methodological diversity of the analyzed studies. It is difficult to directly compare the results due to differences in how the research is approached, the duration of the experiments, and the evaluation metrics [30, 31]. Additionally, most stud-

ies focus on specific populations and controlled environments, limiting the possible generalization of the results to broader contexts [19, 32]. While this heterogeneity reflects the complexity of the topic, it also highlights the need for more uniform standards in future research.

The assessment of the effectiveness of video games is affected by the rapid evolution of technologies and the games themselves [32]. Our review, based on studies up to the 2022 cutoff date, may not capture recent developments in the video game industry that could influence their educational applicability [23].

The long-term persistence of knowledge acquired through video games emerges as a crucial area for future research. Most of the reviewed studies focus on short-term assessments, leaving unexplored the effective duration of the impact of acquired vocabulary [33]. Research addressing long-term retention and the maintenance of linguistic skills after exposure to video games will provide a more comprehensive insight into their long-term utility in educational settings.

The adaptation of video games for inclusive education is another avenue deserving further attention. The diversity of educational audiences suggests the need to design games that are accessible and effective for a variety of students, including those with different language abilities and learning styles. Research focused on adapting video games to address the diverse needs of students would be a valuable step.

Through the process of literature selection, debates, and reflections, the transformative potential of video games, especially those focused on adventure, to enrich vocabulary acquisition and its retention is highlighted. Emotional connection and immersion offer a powerful catalyst for learning, but this enthusiasm is challenged by practical and cultural challenges [30, 19]. According to our observations based on the sampled texts, video games have proven themselves effective allies for vocabulary acquisition, at least in the short term.

This analysis is not confined to classrooms; it transcends academic boundaries and projects into the broader landscape of culture, technology, and educational policies, emphasizing the need for innovation. Digital barriers, cultural adaptation, differing student needs present challenges that require careful and strategic attention [32, 19]. This review stresses the importance of a continued exploration and betterment of the integration of video games in language learning. This is an evolving field, and our research not only contributes to furthering the understanding of its current effect on education, but also guides us in the future practical implementation of this tool on diverse environments. Specific recommendations for future research include the importance of exploring the long-term persistence of knowledge acquired through video games, adapting these games for inclusive education, examining their impact in different cultural contexts, and delving into the effective integration of music in the educational design of video games [33, 23].

Ultimately, this review reveals the potential of video games as educational tools and allies; it raises crucial questions about overcoming challenges, adapting to diversity, and maximizing the positive impact of this technology on vocabulary acquisition for ESL students. May these reflections inspire future research and contribute to the ongoing evolution of education through the innovative use of video games.

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