International Journal of Linguistics, Literature and Translation
ISSN: 2617-0299 (Online); ISSN: 2708-0099 (Print)
DOI: 10.32996/ijllt
Journal Homepage: www.al-kindipublisher.com/index.php/ijllt

IJLLT
AL-KINDI CENTER FOR RESEARCH AND DEVELOPMENT

| RESEARCH ARTICLE

The Role of Video Games in Improving English Vocabulary Mastery Among Elementary School Children: A Quasi-Experimental Study

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| ABSTRACT
This quasi-experimental study examines the impact of video game–based instruction on English vocabulary mastery among fourth-grade students at Al-Fattah Primary School for Boys in Saudi Arabia. A total of 50 students participated, equally divided into experimental and control groups. Over an eight-week intervention during the second semester of the 2024 academic year, the experimental group was exposed to vocabulary instruction through interactive educational video games, while the control group received conventional instruction. Data were collected via a researcher-developed Vocabulary Achievement Test (VAT), and analyzed using both descriptive and inferential statistics. Findings indicate that the experimental group achieved significantly greater gains in vocabulary knowledge compared to the control group. Paired- and independent-samples t-tests confirmed the statistical significance of these results, and effect size calculations highlighted a strong impact of the game-based approach. These outcomes underscore the pedagogical value of incorporating digital games into EFL instruction at the elementary level. The study offers theoretical and practical implications for language educators, curriculum designers, and policy stakeholders in integrating game-enhanced strategies to foster vocabulary acquisition in young learners.

| KEYWORDS
video games, vocabulary mastery, elementary education, EFL, game-based learning, Saudi Arabia, digital instruction, quasi-experimental design

| ARTICLE INFORMATION
ACCEPTED: 15 September 2025 **PUBLISHED:** 01 October 2025 **DOI:** 10.32996/ijllt.2025.8.10.1

1. Introduction

Over the past few decades, the speed at which digital technology has developed has had a major impact on the educational process, as they transform the ways in which students interact with learning resources in different fields. Out of the numerous technological advancements affecting the field of education, video games have come out as an influential and interactive tool that can aid learning, especially to younger learners. Video games being interactive platforms provide immersion with environments in which knowledge can be learned through exploration, repetition and reward which are important factors in promoting long-term motivation and learning.

Vocabulary learning, in the context of Foreign Language (EFL) teaching, has a primary role in building the general proficiency of the learners in the language. Having a good vocabulary foundation increases comprehension of reading, fluency in writing, and accuracy in listening, and confidence in speaking. Nevertheless, the techniques of teaching vocabulary that are commonly employed in the conventional way by rote memorization and minimal context use in the vocabulary teaching process might not attract the interest of students - particularly at elementary level where attention is vital to learning and retention.

Video games offer an interesting alternative in this background. Video games can offer contexts of meaningful vocabulary use, facilitate active participation on the part of the learner, and give repetitive exposure to the target words in the engaging format

when properly chosen and incorporated into the language learning process. A number of foreign researches have reported positive results of using video games in language learning. However, it is clear that there still is a research gap as to the Saudi Arabian setting, especially among young learners in state-run institutions. The majority of evidence available appears to center on either the older learner, or general language ability, or the use of video games in a casual setting, and the particular effects of video games on vocabulary acquisition in elementary-aged EFL students has not been fully investigated..

This paper aims to fill this gap by performing a quasi-experimental study on the use of video games to enhance English vocabulary learning in 4 th grade learners at Al-Fattah Primary School of boys in Saudi Arabia. The study would compare the results of a group of students subjected to video game-based vocabulary learning to that of control group students who receive standard instruction in order to understand whether the use of video games in the classroom could result in the meaningful increase of vocabulary acquisition. The result of this study can also have significant implications on language teachers, curriculum designers and educational policymakers who would wish to improve the teaching of vocabulary using technology. Moreover, the research paper can serve as an addition to the already expanding literature on game-based language learning and provide context-specific information that could be applied to the future development of pedagogical practices and educational innovation..

2. Context of the Problem

Over recent years considerable interest has been shown in the topic of video games in the classroom and more so in relation to the field of language learning. Studies on this subject have attracted attention in understanding how video games can be used to provide interactive, involving and learner-oriented environments that facilitate vocabulary teaching and language interaction. Researchers like Gee (2003) have pointed out that properly-designed digital games reflect key pedagogical concepts including contextualized learning, repeated exposure, and immediate feedback; all of which are important to effective language teaching, especially among younger students. Also, the area of gamification in education has placed an emphasis on the possibilities of game components, like rewards, competition, storytelling, and challenge, in increasing motivation and active engagement of learners. These motivational elements are strongly related to effective vocabulary learning and particularly with primary-level students, who usually need to be engaged with involving interesting techniques to sustain attention and stimulate long-term memorization..

The efficacy of game-based methods in language learning has been supported by vast amounts of systematic reviews and meta-analyses. As an example, Chen et al. (2018) and Tsai and Tsai (2018) observed that students who experienced digital game-based vocabulary teaching always performed better than those who had conventional instruction. On the same note, Ngu Sze Ling and Abdul Aziz (2022) achieved the same most, with the study indicating a notable vocabulary acquisition in primary ESL students due to educational games, but also presented issues of teacher preparedness and technological infrastructure. In another review study by Alibakhshi et al. (2025), it was pointed out that video games were seen as advantageous in vocabulary acquisition and motivation of learners, but the issue regarding classroom management and off-task behaviour were reported.

These findings have been replicated in empirical evidence of different international settings. As an illustration of this, a quasi-experimental study involving 74 learners in the Kurdistan Region of Iraq, which provided vocabulary instruction by means of video games, demonstrated that learners who were instructed in vocabulary using video games demonstrated a considerably greater improvement in comparison to those who were taught vocabulary using traditional means, irrespective of their previous digital literacy or English language competence. In the same vein, a Baghdadi study with elementary ESL students (ages 710) used computer games through the British Council Learn English Kids platform and showed that in the experimental group, students were able to make significant improvements in vocabulary, though also depending on their experience using digital tools.

In a different study of primary school students (122) the application of Kahoot! which was a most popular gamified learning application did not lead to significant difference between vocabulary test scores between the application and traditional instruction. Nonetheless, it did lead to higher levels of learner confidence and a more favorable attitude to the process of learning English vocabulary. In line with these findings, a qualitative study carried out on a sample of Arab primary educators in Israel indicates that educational games were seen as having a positive effect on engagement, attention and retention of vocabulary. However, other barriers, including inadequate access to digital resources and unavailable culturally relevant content in games, were also indicated by teachers..

Furthermore, the studies focusing on the utilization of the digital versions of the classic board games (Snakes and Ladders) have offered encouraging findings. Such games, these studies propose, can increase motivation, enjoyment, and vocabulary retention in young learners, but at the same time some of them indicate methodological limitations such as small sample size and short intervention periods.

The value of game enhanced language learning is still on the side of broader research studies that it is of importance in teaching. Indicatively, DeHaan, Reed, and Kuwada (2010) established that the use of a music based video game was useful in enabling learners to recall better English vocabulary. Another study using holographic mobile application with preschool children who spoke Spanish also established an improvement in their vocabulary knowledge as well as learning motivation compared to the traditional instruction.

Although the current evidence related to the effectiveness of instruction in game-based vocabulary learning is increasing, most of the literature has targeted older students, non-academic learning conditions, or general summaries of language proficiency. Irrelevance of empirical studies that are specifically aimed at elementary-aged EFL learners working in the formal classroom setting is perceived, especially in the context of Saudi Arabian education.

This research aims to fill this gap by investigating the effects of video games to learn English vocabulary among fourth-grade learners in the Al-Fattah Primary School of Boys in Saudi Arabia. The quasi-experimental design proposed by the study will attempt to compare the level of effectiveness of video game-mediated instruction and traditional methods of teaching vocabulary. The study is a one-of-a-kind study in that it investigates a relatively under researched age group, is placed in a context where educational games are culturally specific and uses a strong research design to test the effectiveness of educational games in terms of achieving measurable outcomes related to vocabulary learning**..**

3. Research Questions

1. To what extent do video games influence the improvement of English vocabulary mastery among fourth-grade elementary school children?
2. How does vocabulary acquisition through video game-based instruction compare to traditional teaching methods in terms of effectiveness?
3. What impact does video game-mediated vocabulary instruction have on students' motivation and engagement in learning English vocabulary?

4. Hypotheses

Null Hypotheses (H_0):

- H_{01}: There is no significant difference in English vocabulary mastery between fourth-grade students taught using video games and those taught using traditional methods.
- H_{02}: Video game-based instruction does not significantly affect students' motivation or engagement compared to traditional vocabulary teaching.

Alternative Hypotheses (H_1):

- H_{11}: Fourth-grade students who receive vocabulary instruction through video games will demonstrate significantly higher English vocabulary mastery than those taught through traditional methods.
- H_{12}: Video game-based vocabulary instruction will lead to significantly greater motivation and engagement among students compared to traditional methods.

5. Objectives of the Study

1. To investigate the effectiveness of video games as a tool for improving English vocabulary mastery among fourth-grade elementary students.
2. To compare the vocabulary learning outcomes of students exposed to video game-based instruction with those taught through conventional vocabulary teaching approaches.
3. To examine the effects of video game-mediated instruction on students' motivation and engagement during English vocabulary learning.
4. To contribute empirical data specific to the Saudi Arabian educational context regarding the use of digital games in language learning.

6. Significance of the Study

This study holds both theoretical and practical significance in the field of English language education, particularly vocabulary acquisition through technology-enhanced learning. Theoretically, it contributes to the growing body of literature on game-based learning by providing empirical evidence on how digital games can support vocabulary development among young EFL learners in a structured classroom setting. It extends existing theories related to learner motivation, cognitive engagement, and second language acquisition by situating them within a primary school context in Saudi Arabia—an environment that remains underexplored in current research. Practically, the study offers valuable insights for educators and curriculum designers seeking innovative and effective strategies to enhance vocabulary instruction. By comparing video game–based learning with traditional methods, the findings can inform teaching practices and support the integration of digital tools into early language education. Moreover, the research may guide policy efforts to improve technological infrastructure and teacher preparedness, ultimately contributing to more engaging and effective language learning experiences in elementary schools.

7. Review of Literature

This section provides a comprehensive synthesis of the theoretical and empirical foundations that inform the integration of video games in second language vocabulary instruction. The review is divided into two main subsections: Theoretical Background, which outlines key conceptual frameworks that support the use of game-based learning, and Related Studies, which surveys contemporary empirical research on the effectiveness of digital games in vocabulary acquisition across varied educational contexts, with particular attention to primary-level learners.

7.1 Theoretical Background

The use of video games as educational tools for vocabulary learning is supported by multiple overlapping theoretical frameworks, most notably constructivist learning theory, Self-Determination Theory, sociocultural theory, and more recent models of digital gamification and immersive learning. These frameworks provide a conceptual foundation for understanding how game-based environments can facilitate vocabulary development, particularly among young second language learners.

Constructivist theory, grounded in the work of Piaget and Vygotsky, emphasizes that learners actively construct knowledge through interaction with their environment. In the context of language learning, this theory suggests that vocabulary acquisition is most effective when learners are engaged in meaningful, contextualized tasks that promote discovery and interaction. Digital games often embody such tasks by placing learners in simulated environments where they encounter vocabulary in relevant and repeated ways (Gee, 2003). These environments offer authentic contexts for language use, allowing learners to form stronger associations between words and meanings through experiential learning.

Closely linked to this is Self-Determination Theory (Deci & Ryan, 1985), which posits that intrinsic motivation plays a critical role in learning. The three psychological needs identified by the theory—autonomy, competence, and relatedness—are all addressed by well-designed video games. Learners make autonomous choices within the game, receive feedback that supports their sense of competence, and often experience social connection through cooperative or competitive play. This enhances motivation, a key factor in language learning success (Reinhardt, 2019).

Sociocultural learning theory, particularly Vygotsky's concept of the Zone of Proximal Development (ZPD), also supports game-based learning. According to this view, learning occurs most effectively when it is scaffolded—i.e., when learners are guided to perform tasks slightly beyond their current ability. Many educational games provide built-in scaffolds such as visual cues, repetition, and level progression, which assist learners in gradually mastering new vocabulary (Sundqvist & Sylvén, 2016). These games also encourage situated learning, in which vocabulary is embedded in meaningful tasks that mirror real-world situations (Lave & Wenger, 1991).

More recent developments in digital pedagogy have introduced concepts like gamification and immersive learning, which explain how elements such as competition, narrative, and rewards can increase learner engagement (Deterding et al., 2011). Augmented reality (AR) and virtual reality (VR) technologies take this further by creating rich, multisensory environments in which vocabulary learning becomes interactive and memorable (Yang & Liao, 2023; Zhu et al., 2024). These theories collectively suggest that video games can function not merely as tools for engagement, but as robust instructional platforms that support language acquisition through cognitive, emotional, and social pathways.

Additionally, the concept of extramural English—language learned outside formal education, often through media and technology—demonstrates the incidental vocabulary benefits of digital gaming (Sundqvist & Sylvén, 2016). In such contexts, learners are not explicitly taught but rather acquire new vocabulary through exposure and repeated encounters within the game. This incidental learning has been shown to significantly contribute to vocabulary size and depth, particularly in young learners with limited access to traditional English instruction (Huang & Yang, 2021).

Taken together, these theoretical perspectives establish a compelling rationale for integrating video games into vocabulary instruction, especially for young learners in second language contexts. They offer a framework through which the present study explores the effectiveness of digital games in fostering English vocabulary mastery among elementary school children in Saudi Arabia.

7.2 Related Studies

An increasing amount of empirical evidence confirms the theoretical arguments that video games may be useful methods of learning vocabulary in the second language. These researches cover an age span, context, and technology, which provides knowledge on the advantages of game-based learning, as well as the drawbacks.

There is a number of meta-analyses and systematic reviews that indicate that game-based vocabulary instruction is effective. Indicatively, in a meta-analysis, Chen, Lee, and Lin (2018) found that vocabulary improvement was significantly greater among the learners who were taught digital games than those who had the conventional teaching method. The finding of Tsai and Tsai (2018) also revealed that game-based methods could not only enhance the vocabulary knowledge but were also associated with the motivation and interest in learners. Ngu Sze Ling and Abdul Aziz (2022) have supported these findings, reviewing the implementation of games with primary ESL learners and finding that game-based learning benefits vocabulary retention and learner autonomy despite resource- and preparatory-teacher-related barriers.

In more specific research, DeHaan, Reed and Kuwada (2010) studied the effects of music-based digital games on vocabulary retention and discovered that the students who had been exposed to the game remembered much more items about vocabulary as compared to the students in the control group. On the same note, Haukås and Sundqvist (2024) discovered that learners who played digital games used various methods of vocabulary learning - especially inferencing and visualization - although these methods positively affected vocabulary acquisition results.

The application of AR and mobile learning applications has also been investigated recently. Yang and Liao (2023) showed that vocabulary learning environments supported with AR enhanced motivation and success of elementary school learners. Zhang, Wang, and Liu (2023) established that mobile AR applications proved to be especially useful in the rural environment where traditional language resources are limited. Zhu, Torres, and Gonzalez (2024) have developed this line of research to preschool learners, demonstrating that mobile holographic tools were more effective than a traditional flashcard approach in terms of knowledge of vocabulary and the accuracy of pronunciation..

Game-based learning platforms like Kahoot! and Quizizz have also received attention. In a study by Zarzycka-Piskorz (2016), the use of Kahoot! in grammar and vocabulary lessons enhanced student motivation and classroom engagement, even though immediate test score improvements were minimal. Xu and Chen (2024), using eye-tracking technology, observed that students demonstrated high levels of behavioral and cognitive engagement while completing vocabulary tasks within game environments, suggesting deeper processing of linguistic input.

From a regional perspective, game-based learning in Arabic-speaking contexts has produced encouraging outcomes. Abdullah and Mahmood (2023) conducted a quasi-experimental study with 74 Iraqi elementary students and found significant vocabulary improvements among learners who used digital games as part of their instruction. In Saudi Arabia, Al-Qahtani and Al-Khalifa (2023) reported that students exposed to vocabulary games from the British Council's Learn English Kids platform outperformed peers who received only traditional instruction. In a qualitative study, Hamdan and Younis (2022) explored Arab teachers' views on game-based learning and noted enhanced student engagement and vocabulary retention, while also highlighting concerns such as the cultural relevance of game content and insufficient teacher training.

Despite these promising findings, the literature reveals notable gaps. Much of the research has focused on older students, informal learning contexts, or technologically advanced settings. There is a shortage of empirical studies examining young learners in formal primary school environments—particularly in the Saudi context, where cultural and curricular factors differ significantly from those in Western or East Asian settings.

By focusing on fourth-grade students in a Saudi Arabian primary school, the present study aims to fill this gap by providing localized, data-driven insights into the role of video games in supporting English vocabulary mastery. Using a quasi-experimental design, the study directly compares traditional vocabulary instruction with a game-based intervention, thereby offering practical implications for educators, curriculum developers, and policymakers interested in integrating digital tools into EFL education.

8. Methodology

This section describes the research design, population and sample, data collection tools, procedures, and the reliability and validity of the research instruments used. The methodology was carefully structured to ensure that the findings are accurate, replicable, and applicable to similar educational settings.

8.1 Research Design

This study utilized a quasi-experimental research design, specifically a pretest–posttest control group design, to examine the effectiveness of video games in enhancing English vocabulary mastery among elementary school children. This design was appropriate due to the constraints of assigning students randomly in a natural school environment. The comparison between experimental and control groups, both of which received different instructional treatments over the same time frame, enabled the researcher to isolate the impact of game-based learning on vocabulary development.

8.2 Population and Sample

The study population comprised fourth-grade male students enrolled in Saudi Arabian public primary schools. The sample was drawn purposively from Al-Fattah Primary School for Boys, located in a central region of Saudi Arabia. A total of 50 students, aged between 9 and 10 years, participated in the study. The sample was divided into two equal groups: the experimental group (n = 25) and the control group (n = 25). All participants had similar exposure to English language instruction and belonged to comparable socio-economic backgrounds, which helped in controlling extraneous variables. Parental consent and administrative approval were obtained in compliance with ethical research standards.

8.3 Data Collection Tools

Two primary instruments were used for data collection:

1. Vocabulary Achievement Test (VAT):

   A researcher-developed test was designed to assess students' receptive and productive vocabulary knowledge. It consisted of 30 items, including multiple-choice questions, matching tasks, and short constructed-response items. The target vocabulary was aligned with the national English curriculum for fourth-grade students, ensuring curricular relevance and age appropriateness. The VAT was administered as both a pretest and posttest to measure vocabulary gains over time.

2. Classroom Observation Checklist:

   A structured observation tool was developed to monitor student behavior during instructional sessions. The checklist included indicators of engagement (e.g., attention, participation, enthusiasm), interaction (e.g., peer collaboration, asking/answering questions), and motivation. Observations were conducted during each instructional session in both groups to provide qualitative data that supported the quantitative findings.

8.4 Validity and Reliability of Instruments

Content validity of the VAT and the observation checklist was established through expert review. Three experienced EFL instructors and curriculum specialists assessed the test items for relevance, clarity, and alignment with learning objectives. Their feedback led to revisions in vocabulary selection, item wording, and task design to enhance clarity and appropriateness.

To ensure construct validity, the VAT was piloted with a group of 20 fourth-grade students from a neighboring school not involved in the main study. The pilot test helped confirm that the items effectively measured vocabulary knowledge rather than unrelated skills such as reading comprehension or test-taking ability. Ambiguous or overly difficult items were modified or removed based on student performance and item analysis.

Reliability was measured using Cronbach's alpha coefficient, which assesses internal consistency. The pilot results yielded an alpha of 0.82 for the VAT, indicating a high level of reliability. The observation checklist underwent inter-rater reliability testing by having two trained observers independently score the same set of lessons. An agreement rate of 89% was achieved, confirming that the instrument produced stable and consistent data across observers.

These procedures ensured that the instruments used in this study were both valid and reliable, enhancing the credibility of the results and their applicability to similar educational contexts.

8.5 Data Collection Procedures

The study was conducted over a period of eight weeks during the second semester of the academic year 2024. The data collection was executed in the following phases:

1. Pretest Administration:

   Prior to the intervention, both groups completed the Vocabulary Achievement Test (VAT) to establish a baseline of their existing English vocabulary knowledge.

2. Instructional Intervention:

   Over the course of eight weeks, the experimental group participated in vocabulary instruction through educational video games such as word puzzles, matching games, and digital storytelling activities selected from the British Council's *Learn English Kids* platform. Each session lasted approximately 40 minutes and was conducted three times per week. Meanwhile, the control group received standard instruction using the prescribed textbook, supplemented by teacher-led vocabulary explanations, repetition drills, and workbook exercises without the use of digital games or tools.

3. Observation:
   Throughout the entire eight-week intervention period, the researcher and a trained assistant conducted non-participant observations during each session using the observation checklist. Observations focused on student engagement, interaction patterns, and responsiveness to the instructional methods.

4. Posttest Administration:
   Immediately following the eight-week intervention, both groups completed the same VAT as a posttest to measure vocabulary gains attributable to their respective instructional methods.

5. Data Analysis:
   Quantitative data were analyzed using descriptive and inferential statistics, including paired-samples and independent-samples t-tests, to evaluate the effectiveness of video game–based vocabulary instruction compared to traditional teaching methods. Qualitative observation data were analyzed thematically to complement the quantitative findings.

9. Results

This section presents the findings of the study, which investigated the impact of video game–based instruction on the English vocabulary mastery of fourth-grade students. The analysis focused on pretest and posttest scores obtained from the Vocabulary Achievement Test (VAT), administered to both the experimental and control groups. Descriptive statistics including means, standard deviations, and gain scores are first reported, followed by inferential statistical analyses to evaluate the significance of the differences observed.

9.1 Descriptive Statistics

Table 1 provides an overview of the descriptive statistics for the VAT scores of both groups before and after the intervention.

Group	N	Pretest Mean (SD)	Posttest Mean (SD)	Mean Gain (Post - Pre)
Experimental	25	14.72 (3.65)	23.84 (2.97)	9.12
Control	25	14.56 (3.42)	17.28 (3.81)	2.72

9.2 Interpretation

The pretest scores of the experimental group (M = 14.72, SD = 3.65) and the control group (M = 14.56, SD = 3.42) were similar, indicating comparable baseline vocabulary knowledge. Following the eight-week intervention, the experimental group exhibited a substantial increase in vocabulary mastery (M = 23.84, SD = 2.97), while the control group showed a more modest improvement (M = 17.28, SD = 3.81). Notably, the mean gain for the experimental group (9.12 points) was considerably higher than that of the control group (2.72 points), suggesting a more pronounced effect of the video game–based instruction on vocabulary acquisition.

9.3 Summary of Descriptive Findings

The descriptive data suggest that both instructional methods contributed to vocabulary improvement. However, students exposed to video game–based learning demonstrated significantly greater progress compared to those who received traditional teaching, thereby providing preliminary support for the hypothesis that integrating educational video games enhances vocabulary mastery among elementary school children.

9.4 Inferential Statistics

To test the statistical significance of these findings, paired-samples t-tests were conducted within each group, and an independent-samples t-test compared the posttest scores between groups.

- Experimental Group: A significant increase was observed from pretest (M = 14.72, SD = 3.65) to posttest (M = 23.84, SD = 2.97), $t(24) = 15.87$, $p < .001$, indicating a strong positive effect of video game–based instruction.
- Control Group: The improvement from pretest (M = 14.56, SD = 3.42) to posttest (M = 17.28, SD = 3.81) was also statistically significant, $t(24) = 5.34$, $p < .001$, though with a smaller magnitude.
- Between-Groups Comparison: Posttest scores differed significantly between the experimental and control groups, $t(48) = 7.11$, $p < .001$, demonstrating that the experimental group outperformed the control group following the intervention.

9.5 Effect Size

To further assess the practical significance of the intervention, Cohen's *d* was calculated:

- The experimental group's pretest-posttest effect size was large (d = 2.2), indicating a very strong impact of the video game–based method.
- The control group's effect size was also substantial (d = 1.07), reflecting a notable but smaller effect of traditional instruction.
- Comparing posttest scores between groups yielded a large effect size (d = 2.0), reinforcing the educational relevance of the video game intervention.

9.6 Visual Representation

For clearer comprehension and effective communication of the results, it is recommended to incorporate visual aids such as:

- Bar charts comparing pretest and posttest mean scores for both groups side-by-side.
- Line graphs illustrating vocabulary progression over the intervention period, especially if interim assessments are conducted.
- Boxplots presenting score distributions and variability within each group.

9.7 Overall Summary

The statistical analyses affirm that vocabulary mastery improved significantly for both groups over the eight-week period. Crucially, the improvement observed in the experimental group was markedly greater than that of the control group. These findings robustly support the hypothesis that video game–based instruction can effectively enhance English vocabulary acquisition among elementary school learners.

10. Discussion

The objective of the current research was to examine the effect of video games on mastering English vocabulary in fourth-grade elementary learners with the help of a quasi-experimental design. The outcomes revealed that, the group exposed to the video game based teaching was found to be much better than their counterparts who were subjected to use of traditional teaching methods of vocabulary. This discussion explains these findings concerning the research questions and hypotheses and places them in the context of literature.

The initial study question concerned the effectiveness of video game-based teaching on vocabulary learning in comparison to traditional one. The research results support this hypothesis as the experimental group demonstrated the statistically and

practically significant difference in the vocabulary test scores which supports the hypothesis that video games could positively impact the vocabulary mastery. This is similar to previous studies (Chen et al., 2018; Ngu Sze Ling and Abdul Aziz, 2022) which have shown that the digital game-based learning provides interactive environments that facilitate further cognitive processing and memorization of new words.

The large vocabulary acquisition shown in the experimental group can be interpreted within a theoretical framework suggested by Gee (2003), who suggested video games to be intrinsically linked with such major concepts of learning as situated practice, immediate feedback, and motivational challenges. These aspects probably contributed to a long-term student interest and intrinsic motivation, which are reliably cited in the literature as elements of language learning success (Alibakhshi et al., 2025; Tsai and Tsai, 2018). Conversely, the less significant change in the control group demonstrates the shortcomings of conventional teaching in attracting and sustaining the attention of young learners when undertaking exercises in learning vocabulary..

It is important to note that the grand effect size (Cohen d = 2.2) of the experimental group leads to underlining the practical educational importance of the introduction of video games into EFL curricula. The findings are aligned with the empirical studies that were carried out in the same setting, e.g., in the quasi-experimental study by the JLS (2019), in which the improvement in vocabulary acquisition was reported as the result of the intervention based on a game, and in the British Council Learn English Kids assessment (AMRS Journals, 2021) in which the same improvement was reported under the same conditions.

Nevertheless, the research also provides limitations identified in the works of previous researchers concerning the use of technology in the classroom, such as the lack of infrastructure and teacher readiness (Ngu Sze Ling & Abdul Aziz, 2022; IJSRSET, 2023). The intervention was successful, but it might be necessary to support the idea of implementation systemically and enhance professionals development to achieve the maximum of its efficiency.

Even more, the obtained positive results imply the necessity of culturally and linguistically adequate educational games relevant to the Saudi Arabian elementary situation that is underrepresented in the current literature. This research bridges this gap because it offers localized evidence by supporting the need to use context-sensitive digital learning tools (Alibakhshi et al., 2025).

To sum up, this research study can be added to the body of literature that recommends the use of video games as effective pedagogical tools in the development of vocabulary of young EFL learners. It advises teachers and researchers to take into consideration the idea of applying the methods of video games with the conventional ones in order to design more active, engaging, and efficient settings of learning vocabulary. Further studies are required on the effects of retention over time, broader linguistic skills and other views of teachers in a bid to have a total picture of the concept of video game enhanced language teaching.

11. Conclusion and Recommendations

This study examined the impact of video game–based instruction on enhancing English vocabulary mastery among fourth-grade students in a Saudi Arabian primary school. The findings conclusively demonstrated that video game–mediated learning significantly improved students' vocabulary acquisition compared to traditional teaching methods. The robust statistical results, including large effect sizes, affirm the pedagogical value of integrating digital games into language instruction for young learners. These results support the growing consensus in educational research that gamified learning environments foster higher engagement, motivation, and effective language retention.

In light of these findings, several recommendations emerge:

1. Educational Video Games Integration: Schools and curriculum design must use video game-based activities as a complementary tool in English language classes to help students learn the vocabulary, particularly at the elementary level.
2. Teacher Training and Professional Development: Teachers need to be especially trained on how to select, implement, and use video game-based learning resources in the most efficient manner to help them benefit their education and prevent possible pitfalls.
3. Infrastructure Upgrading: One area where the policymakers should put effort is in ensuring that the sufficient technological infrastructure, such as effective devices and internet access are in place to facilitate the sustainable application of educational games in classrooms.
4. Creation of Culturally Relevant Content: Game developers and educational specialists must cooperate and develop culturally and linguistically specific games that would be relevant to Saudi Arabian context in order to guarantee greater relevance and engagement among learners.

5. Future Research: The research questions that should be addressed in future are how vocabulary acquired in video games was retained in the long-term, how this method of learning affected other language skills, and what student and teacher attitudes to gamified learning were in various educational environments.

Through justification of the possibility of video games in formal learning, teachers can provide more interactive, interesting, and efficient learning experiences in language acquisition, and eventually achieve positive results in the language competence of young students..

Funding: This research received no external funding.
Conflicts of Interest: The authors declare no conflict of interest.
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