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Saudi University EFL Students' Experiences With AI-Powered Games for Learning English Vocabulary

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***Abstract*—The purpose of this study is to explore the attitudes of Saudi EFL university learners regarding the use of AI-generated games in the process of learning English vocabulary. This mixed-methods study includes 150 responses to the questionnaire and 10 responses to a structured interview. The results of the mixed research show that most students use AI tools in learning vocabulary or playing games such as Duolingo, Quizlet, Kahoot, and WordUp. Although most respondents claim to be satisfied with AI-based games, which are interactive, amusing, and effective for retaining vocabulary, the questionnaire analysis indicates that AI games enhance vocabulary size, contextual understanding, and language abilities. At the same time, the students face multiple problems, such as technical difficulties, lack of access to the internet, lack of assistance, and an inappropriate level of gaming content. As far as gaming is concerned, the proposed solutions are increased teacher involvement, training workshops, a better selection of feedback tools, and Arabic translation to help comprehend the message. The interview data partially supports this, with results showing that AI use generally has a positive effect in stimulating interest and autonomy and reducing anxiety. In total, the findings seem to support the creation of authentic and engaging contextual vocabulary learning environments with the help of AI games. However, the positive outcomes will only be instrumental once the instructional, technical, and contextual problems are addressed by means of high-quality training and adjustments in the level of difficulty and integration.**

***Index Terms*—AI-powered learning games, English vocabulary acquisition, Saudi EFL learners, learner attitudes, gamification in language learning**

I. Introduction

Increasing vocabulary is an important part of learning a language because the larger vocabulary learners have, the more effectively they can communicate and understand what they read or hear. Ahmed et al. (2024) highlight the importance of having sufficient vocabulary as a significant element in developing writing skills. They relate EFL university students' errors in paragraph writing unity to the lack of sufficient vocabulary and grammar knowledge. Similarly, Ahmed (2025) emphasizes the significance of vocabulary in developing writing skills by demonstrating that without having sufficient vocabulary, EFL university students encounter writing challenges and cannot understand the written text. Ra'uf (2020), as cited in Ahmed et al. (2025), believes that many EFL learners have difficulties exercising successful communication in English due to a lack of vocabulary knowledge.

Yet conventional methods for vocabulary acquisition, among which rote learning is included, have been criticized as failing to foster a more profound engagement with the language. Alqahtani (2015), as cited in Abu Qbeita (2024), indicates

that several students face challenges in memorizing and using the new vocabulary productively. This problem is mainly due to the complexity of vocabulary, which, in addition to form and meaning, also includes how a word is used across different contexts. Therefore, for the majority of EFL learners, as Alsakaker (2025) quotes Laufer and Hulstijn (2001), it is very difficult to learn new words and enlarge their vocabulary, especially in the non-English-speaking environment where they are not exposed to the target language so much. Since they don't have opportunities to talk with native speakers or to work with authentic resources, using and practicing new words is difficult.

To overcome this challenge, there is a growing interest in the use of technology, and in particular Artificial Intelligence (AI), to improve language learning results. Learners could also learn to use such language learning technology and open the possibility of going beyond rote memorization. This change allows students to work more deeply on the language and improves their overall performance. Previous research has demonstrated the potential benefits of artificial intelligence in developing English language vocabulary. Skripsi and Salam (2024) show how AI has this transformative capacity to change the process of vocabulary learning so that new teaching strategies could make teachers and students more innovative in developing languages. In addition to improving core language skills, AI has shown remarkable potential in developing micro-skills such as grammar, pronunciation, spelling, and—most notably—vocabulary.

By offering engaging and adaptive methods, Simon and Taverniers (2011), as cited in Skripsi and Salam (2024), argue that AI-powered platforms are revolutionizing vocabulary acquisition, providing learners with more effective and enjoyable ways to expand their language abilities. Furthermore, Alsakaker (2025) pointed out that digital learning games have emerged in classrooms, enhancing interaction between students and teachers. Artificial intelligence has been largely integrated into these games, making them conducive to adaptive learning and personalized feedback based on the needs of individual students. As technology advances, the prospects for AI in digital learning games appear boundless, creating innovative avenues for student engagement and educational advancement. For Reinders (2012), as cited in Bin Faleh et al. (2024), digital games have demonstrated significant potential for improving vocabulary acquisition recently. Researchers posit that digital games offer a medium for experimentation within a secure virtual context.

Diverse research examines the role of digital games in vocabulary learning. Ahmed et al. (2026) found that AI-powered digital games positively shape Saudi EFL university students' learning experiences by enhancing motivation, engagement, and vocabulary retention through interactive activities, immediate feedback, and gamified rewards. Similarly, Ibrahim et al. (2025) also reported that AI-powered games positively shaped Saudi EFL students' motivational and emotional learning experiences by fostering learner autonomy, self-regulation, and a strong sense of learner identity, enabling students to perceive themselves as active English users rather than passive recipients of instruction. Furthermore, deHaan et al. (2010) found that playing a music video game significantly improved learners' new word retention compared to traditional learning methods. Miller and Hegelheimer (2006), as quoted in Alshabeb (2024), noticed that students who took part in an adventure game had better recall abilities for target vocabulary than those in the non-adventure groups.

Moreover, digital games, as Gee (2004) in Iacovides et al. (2011) believes, can be powerful learning environments because they encourage active learning and participation within "affinity groups." Kazu and Kuvvetli (2023) state that students can practice and enhance their language abilities in an engaging and interactive setting by using digital games that present vocabulary in a fun and interesting manner. Ahmed et al. (2026) also reported that AI-enhanced vocabulary games foster personalized and autonomous learning experiences among Saudi EFL students; however, these experiences may be affected by technical challenges and limited pedagogical support. Ibrahim et al. (2025) found that AI-powered, gamified learning environments significantly enhanced Saudi EFL students' vocabulary learning experiences by providing adaptive, real-time feedback that increased engagement, reduced frustration, and supported sustained vocabulary practice.

Razali et al. (2025) aim to assess the potential of digital game-based vocabulary learning among high school students in Selangor, indicating that digital games are an effective approach to acquiring vocabulary in the short as well as in the long term. Alsakaker (2025) reports that artificial intelligence in digital learning games has the potential to change how students learn and understand information. Salmanova (2025) argues that AI-empowered gamification has completely redefined the traditional teaching and learning practices through an enhanced level of engagement, motivation, and adaptive learning experience.

Many of these studies have focused generally on the impact of digital games on developing vocabulary. The current study attempts to bridge this gap by handling this topic from different angles by investigating learners' experiences with AI-enhanced digital games for vocabulary learning. This study investigates Saudi EFL university learners' experiences with AI-enhanced digital games for vocabulary acquisition in language learning. Thus, this study seeks to answer the following questions:

1. What AI-enhanced games do learners use most when learning English vocabulary?
2. How do learners perceive their experience of learning English vocabulary through AI-enhanced games?
3. What is the impact of the use of enhanced AI digital games on the learners' learning outcomes?
4. What challenges do learners encounter when learning English vocabulary through AI-enhanced games?
5. What suggestions do learners recommend for overcoming these challenges?

II. Methodology

A. Research Design

The present research utilizes mixed methods and investigates university students' experiences with AI-powered games for learning English vocabulary. The mixed-approach strategy integrates both quantitative and qualitative data collection techniques to offer an in-depth understanding of the subject.

B. Participants and Sampling

The study targets EFL university students in various Saudi universities. The study is conducted during the first semester of the 2025-2026 academic year. The survey is sent randomly via Google Form to many students. Only 150 students responded to the questionnaire. Ten students are also chosen to answer the interview questions.

C. Data Collection Tools

The study employs two tools for data collection as follows:

(a). Questionnaire

An online questionnaire is administered to gather quantitative data on the EFL university students' experiences with AI-powered games for learning English vocabulary. The questionnaire consists of 25 items, covering five main sections. Section (1) focuses on the learners' experience with AI-enhanced digital games for learning vocabulary. Section (2) handles learners' perspectives about the use of AI-enhanced digital games for learning vocabulary. Section (3) sheds light on the impact of AI-powered games on the students' learning outcomes. Section (4) deals with the challenges faced by learners when using AI-powered games to learn English vocabulary. Section (5) focuses on the learners' recommendations for overcoming these challenges.

(b). Interview

The study uses a structured interview to collect more qualitative data for this investigation. It targets 10 university students. It aims to investigate students' experiences with AI-powered games for learning English vocabulary. It consists of five questions: What AI-enhanced games do learners use most when learning English vocabulary? How do learners perceive their experience of learning English vocabulary through AI-enhanced games? What is the impact of the use of enhanced AI digital games on the learners' learning outcomes? What challenges do learners encounter when learning English vocabulary through AI-enhanced games? And what suggestions do learners recommend for overcoming these challenges? The interviews take place in person or through video calls, based on learners' preferences and their availability. Every interview is audio-recorded (with permission) and transcribed for examination.

D. Data Analysis Procedures

Concerning the quantitative data obtained through the questionnaire, frequencies (F) and percentages (P) are included to show the perspectives of EFL university students' experiences with AI-powered games for learning English vocabulary. The questionnaire items are assessed using a 5-point Likert scale ranging from Strongly Agree (SA), Agree (A), Neutral (N), and Disagree (D) to Strongly Disagree (SD). As for the qualitative data, which are obtained through the structured interview, they undergo thematic analysis. After transcribing audio recordings from interviews, responses are grouped into themes and then interpreted in the context of the present study.

E. Validity and Reliability

To ensure the content validity and alignment with study objectives, the questionnaire items and interview questions are reviewed and approved by five experienced teachers after some modifications. Prior to the main questionnaire and interview, a pilot study is conducted with a small group of EFL university students to ensure the clarity, relevance, reliability, and internal consistency of the questionnaire items and interview questions.

F. Ethical Considerations

Participants are informed about the objectives and measures of this study. To ensure the confidentiality of the collected data, the participants are told that the data obtained will be used only for academic purposes. To ensure consistency in the data collection process, the participants are provided with clear instructions and guidelines for completing the questionnaire and interview. Upon receiving the questionnaire link, the participants can access and complete the survey at their convenience.

III. Data Analysis and Discussion

A. Questionnaire Analysis

This part sheds light on the questionnaire analysis needed to answer the research questions. It provides a structured analysis of the questionnaire responses, organized into five categories.

TABLE 1
LEARNERS' EXPERIENCE

NO	Items	SD		D		N		A		SA	
		F	P	F	P	F	P	F	P	F	P
1	I frequently use AI-powered games such as Duolingo, Quizlet, or Kahoot to study English vocabulary.	8	5.3%	15	10.0%	30	20.0%	60	40.0%	37	24.7%
2	AI-powered games are my preferred tools for learning new English words.	10	6.7%	18	12%	33	22%	55	36.7%	34	22.7%
3	My teachers often encourage the use of AI-based vocabulary games in class.	12	8%	20	13.3%	40	26.7%	50	33.3%	28	18.7%
4	I regularly use mobile applications or online platforms that include AI features for vocabulary learning.	6	4%	12	8%	27	18%	65	43.3%	40	26.7%
5	I find AI-powered vocabulary games easily accessible and convenient to use.	5	3.3%	10	6.7%	20	13.3%	70	46.7%	45	30%

The investigation into learner experience indicates strong engagement with AI-powered vocabulary games. For instance, 97 students (64.7%) indicate they often use games such as Duolingo, Quizlet, and Kahoot to learn English vocabulary, while 89 students (59.4%) believe that AI-powered games are their preferred method for learning English vocabulary. While these tools are used by students, teacher support appears to be more limited: not even half of the 78 learners (52%) agree that their teachers promote AI vocabulary games, which represents the space for greater pedagogical support. Accessibility, however, remains high, with 105 learners (70%) indicating regular use of AI-integrated applications and 115 learners (76.7%) finding these tools convenient and easy to use. These figures collectively illustrate that learners independently rely on AI-enhanced games, even though institutional integration has not yet fully matched students' enthusiasm.

TABLE 2
LEARNERS' PERSPECTIVES

NO	Items	SD		D		N		A		SA	
		F	P	F	P	F	P	F	P	F	P
6	Learning vocabulary through gameplay offers an interactive and enjoyable experience.	3	2%	6	4%	12	8%	75	50%	54	36%
7	I find AI-enhanced digital games beneficial for acquiring new words.	4	2.7%	8	5.3%	20	13.3%	72	48%	46	30.7%
8	The games help me stay engaged and motivated to learn new words.	6	4%	10	6.7%	24	16%	68	45.3%	42	28%
9	The feedback and rewards in AI games encourage me to continue learning.	7	4.7%	12	8%	26	17.3%	65	43.3%	40	26.7%
10	I prefer AI-based games over traditional vocabulary learning methods.	15	10%	20	13.3%	30	20%	50	33.3%	35	23.3%

Students have largely favorable opinions about AI-enhanced vocabulary games, with 129 (86%) stating that learning through gaming is engaging and enjoyable. A significant number of learners, ranging from 118 to 123 (71.3%-74%), believe that these games assist in vocabulary acquisition, motivation, and interest. Preferences for AI-based tools are also apparent: 85 learners (56.6%) prefer AI-powered learning over traditional methods, while 35-50 learners (20-33.3%) are neutral or continue to value conventional approaches. These findings indicate that although digital game-based learning is broadly accepted for its motivational and interactive aspects, a substantial number of learners continues to favor traditional methods, emphasizing the necessity of balanced, blended learning.

TABLE 3
IMPACT ON LEARNING OUTCOMES

NO	Items	SD		D		N		A		SA	
		F	P	F	P	F	P	F	P	F	P
11	I have observed improvement in my vocabulary skills after engaging with the games.	4	2.7%	6	4%	20	13%	78	52%	42	28%
12	The games effectively assist in the long-term retention of new words and help me stay updated.	5	3.3%	7	4.7%	22	14.7%	75	50%	41	27.3%
13	I can use the vocabulary learned in these games in real-life contexts.	6	4%	10	6.7%	25	16.7%	70	46.7%	39	26%
14	The games assist me in understanding the meanings and usage of new words.	4	2.7%	6	4%	20	13.3%	78	52%	42	28%
15	These games have positively impacted my overall English performance.	5	3.3%	8	5.3%	22	14.7%	75	50%	40	26.7%

AI-enhanced vocabulary games are considered educationally beneficial. A significant proportion of respondents, comprising 120 to 126 learners (76% to 80%), assert that these games improve vocabulary skills, facilitate long-term retention, encourage practical vocabulary application, and enhance comprehension of meaning and usage. A total of 120 learners (80%) indicate an improvement in vocabulary, while 116 learners (77.3%) claim that the games aid in memory retention. Similarly, 109–117 learners (73%–78%) demonstrate their ability to apply vocabulary in practical contexts and report that the games improve overall English proficiency. These statistics emphasize the strong consensus among learners that AI-supported gameplay substantially enhances vocabulary acquisition, retention, and functional application.

TABLE 4
CHALLENGES AND LIMITATIONS

NO	Items	SD		D		N		A		SA	
		F	P	F	P	F	P	F	P	F	P
16	AI-enhanced vocabulary games do not always align well with English Proficiency Level	10	6.7%	15	10%	30	20%	60	40%	35	23.3%
17	I sometimes have limited internet access, and I face technical challenges which make it challenging to employ games effectively.	8	5.3%	12	8%	25	16.7%	65	43.3%	40	26.7%
18	I lack training in using AI-enhanced games to English vocabulary.	6	4%	10	6.7%	30	20%	70	46.7%	34	22.7%
19	The feedback or responses from AI sometimes seem irrelevant or unhelpful to what is being asked.	12	8%	18	12%	35	23.3%	55	36.7%	30	20%
20	Certain tasks or instructions within the games can be confusing, challenging to follow or hard to understand.	10	6.7%	15	10%	32	21.3%	60	40%	33	22%

Despite their positive attitudes, students acknowledge various significant challenges. A substantial percentage—95 learners (63.3%)—perceive that AI-enhanced vocabulary games do not reliably align with their English ability level. Technical challenges and inadequate internet connectivity impact 105 students (70%), signifying substantial infrastructure limitations. Training challenges are widespread, as 104 students (69.4%) report inadequate preparation for the effective use of these tools. Moreover, challenges with AI responses persist. 84 learners (56%) consider AI-generated feedback to be irrelevant or useless, whereas 93 learners (58%) discover specific instructions and actions in the games to be confusing or challenging to comprehend. These numbers collectively demonstrate that while learners value AI-based tools, the

efficacy of these games is constrained by technological, pedagogical, and design-related challenges that necessitate systematic analysis.

TABLE 5
RECOMMENDATIONS

NO	Items	SD		D		N		A		SA	
		F	P	F	P	F	P	F	P	F	P
21	Games should include more Arabic translations or hints to support understanding.	3	2%	5	3.3%	12	8%	65	43.3%	65	43.3%
22	Teachers should integrate AI vocabulary games more regularly in English classes.	2	1.3%	4	2.7%	15	10%	70	46.7%	59	39.3%
23	AI-enhanced games should match learners' English proficiency levels.	4	2.7%	6	4%	20	13.3%	68	45.3%	52	34.7%
24	AI-enhanced games should offer clearer feedback for learners' errors.	5	3.3%	7	4.7%	22	14.7%	70	46.7%	46	30.7%
25	Learners should be provided with more workshops and training about how use these games to help learners learn better.	2	1.3%	3	2%	10	6.7%	65	43.3%	70	46.7%

Learners' recommendations strongly call for the pedagogical and technical refinement of AI-enhanced vocabulary games. A large majority—130 learners (86.6%)—advocate for more Arabic translations or hints to support comprehension. A total of 129 learners (86%) advocate for the more frequent integration of AI games into English classrooms by educators, reflecting a preference for systematic implementation in the classroom setting. Furthermore, 120–122 learners (76%–77%) express a need for games that align more closely with their proficiency levels and provide clearer, more precise feedback. The strongest recommendation concerns training: 135 learners (90%) stressed the need for workshops that teach them how to use AI-enhanced tools effectively. These statistics demonstrate a clear learner-driven call for improved linguistic scaffolding, more active teacher involvement, better-aligned game difficulty, enhanced feedback mechanisms, and comprehensive training support.

B. Interview Analysis

The students are asked to answer interview questions to gain further insights about their experiences with AI-powered games for learning English vocabulary. The findings provided substantial information to address Research Questions 1, 2, 3, 4, and 5. The following results show the participants' perspectives and responses to the interview questions. Each question will be considered separately:

Question (1): What AI-powered games do you use most when learning English vocabulary? And why?

Analysis of the interview reveals that most of the students use many games in their learning English vocabulary, such as Duolingo, Quizlet, Kahoot, Wordwall/Quizizz, WordUp, Semantle/Contexto, Root Vocab, and Custom AI Vocabulary Games (e.g., ChatGPT-based). The following are some of the random selections of students' responses:

- *I use the WordUp game to learn English words because it is based on my vocabulary proficiency level. It includes quizzes and context-based "word battles."*
- *I like using Duolingo to learn English vocabulary because it is addictive, fun, and effective for daily vocabulary practice.*
- *I employ Semantle/Contexto games to develop my vocabulary because it is based on semantic similarity—it helps me build word associations and meaning awareness.*
- *I prefer using Root Vocab Games to develop my English vocabulary because it uses gamified drills and challenges, which help me master words.*
- *I like using Kahoot to learn English vocabulary because it is effective for vocabulary review.*

Question (2): How do you perceive your experience of learning English vocabulary through AI-powered games?

The interview analysis reveals that students have different perspectives on learning English vocabulary through AI-powered games. The findings show that most learners hold favorable views of the use of games for learning English vocabulary. The analysis of the interview indicates that most participants perceive the application of AI-enhanced digital games in learning vocabulary as a highly effective learning strategy. There is a belief that it offers numerous advantages in terms of learning outcomes. These benefits can be summarized as follows:

(a) AI-powered games make learning English vocabulary more enjoyable, fun, and intriguing.
(b) AI-powered games provide a secure learning setting.
(c) AI-powered games enhance motivation and engagement for the learners to study and practice vocabulary.
(d) AI-powered games improve problem-solving skills.
(e) AI-powered games help learners acquire and understand vocabulary in authentic contexts.
(f) AI-powered games boost learners' vocabulary retention.

(g) AI-powered games are flexible, accessible, and mobile-friendly, allowing learners to study anytime and anywhere.

The following are some responses from the participants:

- *AI-powered games provide a secure learning environment for me where I can experiment, take risks, and learn from my mistakes without fear of repercussions in the real world.*
- *AI-powered games are a more interesting and useful way for me to learn English vocabulary.*
- *AI-powered digital games provide various learning activities, such as quizzes, fun, and flashcards. This variation helps me stay motivated and engaged.*

Question (3): What is the impact of the use of enhanced AI digital games on your learning outcomes?

The data analysis indicates that most learners report that using AI-powered games to learn English vocabulary is a very successful learning strategy. The participants believe that these games impact their learning outcomes. The following summarizes these impacts:

(a) Improving students' ability to recall and understand vocabulary content.

(b) Improving comprehension and application of vocabulary in real context.

(c) Enhancing the development of essential abilities, like collaborative work and problem-solving.

(d) Improving students' learning. Students who engage in AI-powered games develop problem-solving skills, retain information better, and comprehend the learning content better.

(e) When learning through AI gamified systems, students can develop better retention of knowledge and critical thinking skills, and this will result in improving students' academic performance.

(f) Reduction of language learning anxiety: the playful and informal environment of AI-powered games lowers language learning anxiety, especially in vocabulary recall tasks.

(g) Developing the language skills:

Vocabulary acquired from AI-powered games often supports improvements in speaking accuracy, writing fluency, and reading comprehension.

The following are some responses from the participants:

- *By providing immediate feedback, AI-powered vocabulary games enhance my understanding and retention of vocabulary.*
- *By using repetition and adaptive difficulty AI-powered vocabulary games help me retain new vocabulary more effectively.*

Question (4): What challenges have you encountered when using AI-powered games to learn English vocabulary?

The analysis of the interviews reveals that learning vocabulary through AI-powered games presents a variety of challenges for learners. The following is a summary of these challenges:

(a) Learners' boredom: the participants report that boredom can be a barrier in the use of AI-powered games to learn vocabulary. This boredom emerged when the teacher employed the same game frequently.

(b) Learners' frustration: Students feel disappointed when AI-powered game components distract them or conflict with their learning goals.

(c) Distraction: Some AI-powered digital games may prioritize entertainment above learning or education, thereby detracting from the intended learning objectives. That is, these games focus on recreation rather than educational motivation.

(d) Technical challenges: A few students report issues with internet access, device compatibility, or app usability, and these might impede the successful implementation of AI-enhanced games.

(e) The excessive use of screens might be harmful to learners.

(f) Excessive dependence on AI-powered gaming feedback: Excessive dependence on AI-generated gaming feedback could limit students' critical thinking and create a sense of dependency.

(g) Limited Academic Vocabulary Coverage: Many AI games focus on general or conversational vocabulary. The following are some responses from the participants:

- *I become frustrated when the games have too many pop-ups, animations, notifications, or frequent interruptions.*
- *One of the challenges that I have encountered when using AI-powered games to learn English vocabulary is that during gameplay, I often focus on prizes instead of comprehending the meaning of the new words.*
- *There are technical difficulties and disruptions associated with servers or the internet.*
- *Sometimes the gameplay seems more prominent than the actual meaningful work of learning vocabulary.*
- *Focusing on badges, points, and competition pushes the focus away from learning towards mastering the content.*

Question (5): What would you like to recommend for overcoming these challenges?

For addressing challenges the participants face in learning English vocabulary through AI-powered games, they propose the following recommendations:

(a) The game elements should be integrated to complement and enhance the learning objectives, rather than distracting students from them.

(b) Games must balance digital entertainment with physical activities in a learner's daily life to reduce the risks of adverse effects related to excessive screen time.

(c) Games should articulate learning goals that humanity does not normally pursue, favoring instead an emphasis on mastering the content over winning at all costs.

(d) Games should use reflective tasks, that is, pair game sessions with writing or discussion tasks to reinforce meaning.
(e) Limiting session time by avoiding cognitive overload by capping gameplay duration.
(f) Training learners in digital literacy.
(g) Improving feedback quality through combining AI with human support. That is, teachers can review game performance and offer deeper explanations.

C. Discussion of Results

In summary, the results of this study conclusively demonstrate the immense promise of the transmission of AI technologies to games in developing English vocabulary learning among EFL students. The students' responses showed that they had a positive attitude towards learning in interactive and game-based teaching and learning environments compared to traditional methods. According to the results, most students view the AI-based game as enjoyable, effective, and easily accessible, enhancing the motivation, retention, and contextual application of new words. This finding is in line with past research by Reinders (2012), who modeled an interactive language learning concept of focusing on engaging or increasing motivation and active participation, and Kazu and Kuvvetli (2023), in which virtual game-based learning environments were identified as intrinsically fun and engaging spaces for learners to experiment with language.

(a). Themes of Engagement

The dominant theme in both questionnaires and interviews is the issue of engagement. When asked, over 80% of the survey participants regard the AI-powered games to be fascinating and engaging. This makes sense, as Gee (2004) argued that "such spaces are absolutely vital to turning playing into learning and interest-driven endeavors into interest-driven learning engines." The internal rewards promoted by gamification, the challenge of interacting with others, and the learning system that gets better on its own make daily vocabulary use in abbreviations more attractive. The interviews also revealed that the game is a supportive space that allows respondents to risk achieving importance and involvement despite fear and anxiety, which hinders them when learning a new language.

(b). Pedagogical Effectiveness and Learning Outcomes

All students participating in the research report substantial language gains in terms of remembering vocabulary, understanding context, and overall English language performance. Many students also note that such AI-powered tools are essential for enabling them to recall material over longer periods of time through repetition and semantic association, adding to the work of deHaan et al. (2010) and Miller and Hegelheimer (2006), whereby it was noted that learning through play provided higher retention of the vocabulary learned than traditional methods. The AI's adaptive nature allows the student to learn and evaluate their work at an appropriate pace and level, providing learners with context-oriented exercises such as word connection and word similarity games, increasing lexical learning, and transference to real-world problems.

(c). Challenges and Limitations

Notwithstanding the advantages, participants also experienced certain challenges that ensured limited participation. As shown, the key impediments were inadequate technical facilitation, improper training in using AI-based tools, and the grade of games that does not always match the students' level. These findings are in line with Alsakaker (2025), who reported that proficient AI-based learning requires adequate technical facilitation and teacher engagement. In addition, qualitative findings showed potential risks that occur when learners are more focused on receiving estimated rewards rather than mastering the language, which can lead to competitors or lack of consequential depth. For this reason, sufficient facilitation is necessary to help implement a balance between successful and efficient learning.

(d). Role of Teachers and Institutional Support

While learners use AI tools on their own, the role of teachers in promoting the use of such games remains limited. This finding suggests an institutional capacity that requires the development of an AI-based game as well as well-structured educational material. It entails that teachers can assist with applying learning experiences and adjusting AI-powered games with reflection exercises, vocabulary practice, or writing questions to help students integrate into speech the previously learned terms. In addition, combining AI-generated remarks with a teacher's context or support might aid in deepening the understanding and promoting cognitive skills. Therefore, the satisfaction of participants with the proposed workshop highlights the importance of creating a digital experience for students, who are the primary consumers of teachers' efforts.

(e). Cultural and Linguistic Adaptation

Accordingly, a significant part of participants' feedback also touches upon the need for Arabic support or cultural adaptation. The findings reveal that nearly 87% of participants deemed the addition of Arabic hints or translations necessary. The statement indicates that it is still necessary to consider the linguistic background of the Saudi EFL learner, which means it is feasible to combine L1 and L2. Therefore, AI games for students who are in the process of mastering the language should, on the one hand, consider the various linguistic backgrounds and, on the other hand, gradually promote students' immersion in the English language.

In conclusion, the findings concur that AI-powered games revolutionize EFL vocabulary pedagogy. The tools combine education and entertainment by providing varying, interactive, and learner-centric adaptive environments. But infrastructure, pedagogy, and cognitive challenges affect their full potential. Appropriate coordination between AI-aware design learners' cognitive needs, teacher facilitation, and institutionalization can enhance the potential of the tools. This approach transforms them into sustainable and equitable EFL pedagogic elements. Failure to consider the above challenges may result in inaccessibility to the tools due to the pedagogic-expensive factor. Educators may also ignore the availability of the tools for fear of creating ex-nova class-cognitive gaps. Additionally, educators may decide to continue using traditional classroom and exotic game-based teaching strategies. This approach may create the impression that traditional classroom methods and exotic game-based teaching strategies can be easily adapted overnight.

IV. Conclusion

AI-powered games transform EFL students' vocabulary learning experiences positively. The artificial intelligence integrated into the digital learning environments increases motivation, improves long-term vocabulary acquisition, and facilitates EFL students' use of English in contextual field situations. Most learners also develop self-independence through the games. Educators can also seek learners' feedback, thereby enabling the learners to self-reflect on their weak points. Additionally, learners may develop self-confidence knowing that their feedback remains confidential and that there are no insults or victimization, unlike with manual feedback. Again, gamification reduces language learning anxiety. To conclude, AI-driven games open a new bright future for language education that integrates novelty with a clear pedagogical agenda. With the possibility of successful integration, they can enhance the vocabulary learning process and make it more individualized and exciting. Further long-term research, emotional dimensions, and possible differences among students can provide additional data. However, if educators strive to innovate and enhance their technologies and approaches, they will be able not only to integrate technology but also to change the learning process, making it obtainable for everyone and a lifelong journey.

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References

[1] Abu Qbeita, A. (2024). The Effect of Using Artificial Intelligence on Learning Vocabulary among Jordanian EFL University Students. *Evolutionary Studies in Imaginative Culture*, *8.2*(S2), 1890-1907.

[2] Ahmed, F. E. Y. (2025). Improving writing proficiency in a virtual classroom setting: Students' perspectives. *Research Journal in Advanced Humanities*, *6*(1). https:// doi.org/10.58256/wrqvjh64

[3] Ahmed, F. E. Y., Ali, E. H. F., Usmani, S., Kottaparamban, M., Ibrahim, M. A. E.-S., Hamed, F. M. A., & Abdallah, N. M. M. (2026). Applying AI-enhanced digital games in teaching English vocabulary. *Research Journal in Advanced Humanities*, *7*(1). https://doi.org/10.58256/5fqfg723

[4] Ahmed, F. E. Y. Abdallah, N. M. M., Hamed, S. O. E. & Hamed, F. M. A. (2025). Word Choice Errors in EFL Undergraduates' Written Language. *Eurasian Journal of Applied Linguistics*, *11*(1), 79-86. https://doi.org/10.32601/ejal.11107

[5] Ahmed, F. E.Y., Ahmed, Z. A. D., Ali, E. H. F., & Hamed, S. O. E. (2024). Maintaining Unity in the Descriptive Paragraph Writing of Saudi EFL University Students: Challenges and Remedies. *Arab World English Journal*, *15*(1), 245-257. https://dx.doi.org/10.24093/awej/vol15no1.15

[6] Alqahtani, M. (2015). The importance of vocabulary in language learning and how to be taught. *International Journal of Teaching and Education*, *3*(3), 21-34. https://doi.org/10.20472/TE.2015.3.3.002

[7] Alsakaker, S. M., (2025). Investigating EFL learners' Perceptions of Using AI to Enhance English Vocabulary Acquisition Based on The Technology Acceptance Model. *Forum for Linguistic Studies*, *7*(2), 1067–1077. https://doi.org/10.30564/fls.v7i2.8593

[8] Alshabeb, A. M. (2024). Learning Vocabulary via Video Games: A Case Study of Saudi University Students. *Arab World English Journal*, *15*(3), 321-332. https://dx.doi.org/10.24093/awej/vol15no3.19

[9] Bin Faleh, Al-Aosail, A., Lamouchi, A., Ahmed Ibrahim, S., Gafar, M. G., & Elsayed Hafez, W. (2024). Digital Games for Learning Vocabulary: The Effects on Foreign Language Anxiety, Buoyancy, Online Engagement, and Vocabulary Learning. In *Computer Assisted Language Learning Electronic Journal (CALL-EJ)* (Vol. 25, Issue 4). https://orcid.org/0000-0001-7592-840

[10] deHaan, J., Reed, W. M., & Kuwada, K. (2010). The effect of interactivity with a music video game on second language vocabulary recall. *Language Learning & Technology*, *14*(2), 74-94.

[11] Gee, J. P. (2004). *What video games have to teach us about learning and literacy*. New York, NY: Palgrave Macmillan.

[12] Iacovides, I., Aczel, J., Scanlon, E., Taylor, J., & Woods, W. (2011). Motivation, engagement and learning through digital games. *International Journal of Virtual and Personal Learning Environments*, *2*(2), 1–16.

[13] Ibrahim, M. A. E.-S., Ahmed, F. E. Y., Kottaparamban, M., Ali, E. H. F., & Usmani, S. (2025). Innovative AI gaming strategies for enhanced English language skills: A mixed-methods study on adaptive game-based learning in EFL contexts. *Journal of Cultural Analysis and Social Change*, *10*(2), 3913–3923. https://doi.org/10.64753/jcasc.v10i2.2204

[14] Kazu, İ. Y., & Kuvvetli, M. (2023). A triangulation method on the effectiveness of digital game-based language learning for vocabulary acquisition. *Education and Information Technologies*, *28*. https://doi.org/10.1007/s10639-023-11756

[15] Laufer, B., & Hulstijn, J. (2001). Incidental vocabulary acquisition in a second language: The construct of task induced involvement. *Applied Linguistics*, *22*(1), 1-26. https://doi.org/10.1093/applin/22.1.1

[16] Miller, M., & Hegelheimer, V. (2006). The use of CALL in vocabulary acquisition: A review. *CALICO Journal*, *23*(2), 327-356.
[17] Ra'uf, M. M. (2020). Scientific Academic Writing: The Difficulties of Writing Abstracts of Theses and Dissertations in Biological Disciplines. *International Journal of Psychosocial Rehabilitation*, *24*(2), 2078–2087. https://doi.org/10.37200/ijpr/v24i2/pr200508
[18] Razali, N. H., Ahmad, A., Nordin, A. S., Fatimah, S., & Rahman, A. (2025). Exploring the Potential of Digital Game-Based Vocabulary Learning among High School Students in Selangor. *International Journal of Research and Innovation in Social Science*, *IX*(IIIS), 1027-1033. https://doi.org/10.47772/IJRISS.2025.903SEDU0075
[19] Reinders, H. (Ed.). (2012). *Digital games in language learning and teaching*. Palgrave Macmillan. https://doi.org/10.1057/9781137005267
[20] Salmanova, S. (2025). Gamification and AI in Language Learning – A New Era of Digital Education. *Acta Globalis Humanitatis et Linguarum*, *2*(1), 262–269. https://doi.org/10.69760/aghel.02500134
[21] Simon, E., & Taverniers, M. (2011). Advanced EFL Learners' Beliefs about Language Learning and Teaching: A Comparison Between Grammar, Pronunciation, and Vocabulary. *English Studies*, *92*(8), 896–922. https://doi.org/10.1080/0013838X.2011.604578
[22] Skripsi, J. A., & Salam, M. (2024). *Exploring advantages and innovativeness of using AI-based tools for English vocabulary learning: A qualitative study of English education majors at UIN Syarif Hidayatullah* [Unpublished undergraduate thesis]. UIN Syarif Hidayatullah Jakarta.

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