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THE APPLICATION OF AI-ENHANCED DIGITAL GAMES IN DEVELOPING ENGLISH GRAMMAR: STUDENTS' PERSPECTIVES

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ABSTRACT

This study investigates Saudi EFL university students' perspectives on the use of AI-enhanced digital games in learning English grammar. Drawing on a mixed-methods descriptive design, the research examined the types of AI-supported grammar tools students use, their perceptions of these tools, the perceived impact on learning outcomes, and the challenges encountered. Quantitative data were collected from 150 students through a structured questionnaire, while qualitative insights were obtained from structured interviews with 15 purposively selected participants. Descriptive statistics revealed frequent use of AI-driven grammar tools—particularly ChatGPT, Duolingo, GrammarlyGO, Kahoot, and Quizlet—with students reporting generally positive experiences. Learners perceived AI grammar games as enjoyable, easy to use, and effective in enhancing understanding, accuracy, and confidence. Findings also indicated that AI-enhanced games supported faster learning and improved retention of grammar rules. Thematic analysis of interviews further highlighted increased motivation and engagement driven by gamified features, immediate feedback, and convenient access. Despite these benefits, students reported challenges including technical issues, unclear explanations, mismatched difficulty levels, and difficulty maintaining focus during extended activities. Participants recommended improving adaptivity, enhancing interactivity, simplifying feedback, and incorporating culturally relevant examples. Overall, the findings point to strong learner acceptance of AI-enhanced digital games as valuable tools in grammar development, while also underscoring areas requiring refinement. The study contributes to ongoing discourse on AI-supported language learning and offers pedagogical implications for integrating AI-based gamified instruction in EFL contexts.

KEYWORDS: AI-Enhanced Digital Games, English Grammar Learning, EFL Learners, Gamification, Learner Perceptions, Grammar Proficiency, Saudi University Students.

1. INTRODUCTION

According to Nassaji & Fotos (2011) and Novawan (2011), as cited by Aisyiyah et al. (2014), "The importance of grammar is an aspect that cannot be neglected in language learning." It is the foundation for successful language communication, enabling students to form complete sentences and express their meaning. A good grasp of grammar cannot be dispensed with for clear and effective communication, Aisyiyah et al. (2014) explain. It helps students to speak their minds clearly and move the academic community by communicating with others. With a grasp of grammar, they can understand what they study, audit written materials, and comprehend their meaning. Without a solid foundation in grammar skills, students are vulnerable to errors that affect the overall coherence and force of their writing. This lack of proficiency could well affect their performance in school, since written assignments and exams require written language. In the traditional classroom setting, teachers are often forced to teach only to a portion of their students due to class size and time constraints. Conventional methods for teaching grammar, such as lectures with overheads, worksheets, and exercises, are generally tailored to fit all comers rather than zeroing in on the needs of individual students. These methods also usually lack the immediacy of feedback that is necessary for students to understand their mistakes and find out promptly. This delay can cause students to repeat errors, leading to frustration and reduced motivation. For Hashim et al. (2019), a traditional method of teaching is not that effective anymore in imparting knowledge of grammar to students. Conventional grammar teaching, while aimed at developing these skills, often did not encourage practical application and a genuine understanding of language structure. According to Raba (2014) and Liu, Li & Santhanam (2013), as cited in Hashim et al. (2019), ESL learners tend to learn more with the aid of technology because they perceive it to be more exciting and appealing. Consequently, there is a need for an innovative approach that offers immediate, personalized feedback and caters to individual learning needs. Bikowski (2018) and Novawan et al. (2021) argue that technology offers innovative tools and platforms that support diverse learning styles and facilitate interactive teaching methodologies. Nhung and Dương (2024) suggest that AI technology is a good replacement for nowadays traditional grammar teaching. By using AI tools, it automatically tests and critiques manuscripts, pointing out and explaining mistakes in grammar. More than 90% of users' sentences are judged differently from the original, which shows that AI grammar tools perform error analysis and exercises completely adapted to individual students of all levels. With immediate response, students can concentrate on areas in which they need to improve and gradually acquire writing skills. In addition, AI tools provide a continuous environment for practice—as many grammar exercises from native speakers are available via screen reader text as you choose to use. This feedback loop is an excellent way to acquire language down, as students are learning it in real time and can adjust for future assignments based upon past feedback. AI tools facilitate grammar practice, thereby motivating students to engage actively in their learning. This makes the educational experience more effective and enjoyable.

According to Yaccob (2022), research shows that the application of game elements to language educational settings has risen in popularity as an engaging learning method. Hanus & Fox (2015), Buckley et al. (2017), and Poondej & Lerdpornkulrat (2016) all support this. Learning grammar through games can sustain students' interest in improving their understanding of the subject matter. Chambers & Yunus (2017), Hashim et al. (2019), Yaccob & Yunus (2019), and Mee et al. (2020). As a result, students' engagement will enhance their learning and progress. (Rafiq et al., (2019b); Hashim et al., (2019); Poondej & Lerdpornkulrat, (2016). A study conducted by Rahmani (2020) found that the benefits of game-based learning, or gamification, in lessons include improving motivation, developing positive attitudes, better cognitive achievements, and performance in activities. In a study by Bullard and Anderson (2014), gamified learning manages to improve learners' achievement. Likewise, Poondej and Lerdpornkulrat (2016), as referenced in Hashim et al. (2019), argue that learners show improved performance following activities attributed to their participation in the games. Wang and Lieberoth (2016) indicate that DGBL made learning fun for ESL students, which helped them focus more and have a better attitude toward learning. Another investigation by Licorish et al. (2018), as cited in Ray & Ilangovan (2024), found that educational tools such as Kahoot effectively increased student engagement and reduced distractions, indicating that educational technology (EDTech) has emerged as an alternative to traditional educational approaches. Salmanova (2025a) asserts that the incorporation of AI-driven gamification in language learning has transformed conventional pedagogical approaches by augmenting engagement, motivation, and

personalized learning experiences. Students may engage with language through innovative gaming mechanisms, immediate feedback, and AI-driven customization. This enables students to enhance their competencies in immersive and interactive digital settings. Hashim et al. (2019) state that prior research has demonstrated the positive effects of gamified learning in enhancing grammar. The reason behind this improvement, according to Hamari & Hassan (2019) and Flores (2015), lies in the motivation itself, whereby it is stated that students are more motivated and eager to learn while playing. According to Alenezi (2023), Cortizas et al. (2018) found that students who took part in AI-driven gamified learning activities did better on tests and understood the material better than students who did not take part in gamified activities. Similarly, Hashim (2019), as cited in Castillo (2020), studied the effectiveness of using online language games for enhancing ESL Malaysian learners' grammar. Findings revealed that gamified learning was effective in terms of grammar achievement. Students got better results when they learned grammar using online language games. Some factors involved in positive academic achievement included motivation and fun. In Ecuador, Tamayo et al. (2023) reported that students exposed to gamified methods outperformed those receiving conventional instruction in grammar and vocabulary. Lin et al. (2020) in Waluyo et al. (2023) found that using a game-based context helped Taiwanese EFL students understand English grammar better. The experimental group made fewer mistakes in context than the control group.

Despite the positive findings on gamified learning in various fields, there is still limited research on the impact of AI-enhanced digital games on developing grammar in the Saudi higher education context and their impact on students' performance or learning outcomes. Thus, this study aims to bridge this gap by exploring Saudi EFL university students' perspectives about the impact of AI-driven digital games on developing grammatical competence, focusing on their implementation, challenges associated with the integration of AI-driven digital games into the educational setting, and their impacts on the students' learning outcomes. This study is both relevant and significant, as it addresses this gap. It seeks to provide empirical evidence on the impact of enhanced AI digital games on grammar learning and to enhance foreign language learning experiences and outcomes. **The study seeks to answer the following research questions**

1. What AI-enhanced games do learners use most when learning English grammar?
2. How do learners perceive their use of learning English grammar 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 grammar through AI-enhanced games?
5. What suggestions do learners recommend for overcoming these challenges?

2. METHODOLOGY

2.1. Research Design

This study used a mixed-methods descriptive research approach to investigate students' views about using AI-enhanced digital games to learn English grammar. The quantitative part was designed to explore the most popular AI-enhanced games and learners' perceptions of them, including effects, while the qualitative part focused more on an understanding of what students had learned along with their problems encountered and recommendations. By integrating quantitative and qualitative data, the study gained a more comprehensive understanding about the research subjects and enhanced credibility.

2.2. Participants and Sampling

The study addresses EFL college students at different 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. A total of 150 students participated in the quantitative phase through the questionnaire, and 15 students were purposively selected for the structured interviews based on their willingness and their experience using AI-enhanced digital games. Ethical approval was obtained, and all participants gave informed consent before participating.

2.3. Tools of Data Collection

2.3.1. Questionnaire

A structured questionnaire was developed to gather quantitative data related to

- the AI-enhanced digital games learners used to learn English grammar (RQ1);
- learners' perceptions of learning grammar through AI-enhanced games (RQ2);
- the perceived impact of these games on their grammar learning outcomes (RQ3).

The questionnaire consisted of three sections: Section (1) focuses on the learners' experience with

AI-enhanced digital games for learning grammar. Section (2) handles learners' perceptions of learning grammar through AI-enhanced games. Section (3) focuses on the perceived influence of these games on their grammar learning results. The survey was approved by language educators and tested with a small sample of learners for its clarity and reliability. It was corrected before being administered.

2.3.2. Structured Interview

To obtain a richer understanding, a structured interview protocol was designed for the purpose of gathering qualitative transcripts regarding

- The difficulties of learning grammar through AI-based games (RQ4).
- Learners' suggestions for improving the use of AI-enhanced digital games to teach grammar (RQ5).

Interview questions were aligned with the research questions and allowed participants to explain their experiences freely. Each interview lasted approximately 15–20 minutes and was audio-recorded with participants' permission. Notes were also taken alongside the recordings.

The selection of AI-enhanced digital games and tools in this study—namely ChatGPT, GrammarlyGO, Duolingo, Kahoot, Quizlet, and Elsa Speak—was guided by several pedagogical and contextual considerations. First, these platforms are among the most widely used AI-supported applications by Saudi EFL university students, ensuring ecological validity and relevance to learners' real practices. Second, the selected tools integrate artificial intelligence features such as immediate automated feedback, adaptive responses, and error detection, which are directly aligned with grammar learning objectives. Third, many of these platforms incorporate gamified elements (e.g., points, levels, quizzes, and challenges) that support engagement and motivation in grammar practice. Finally, these tools are easily accessible, user-friendly, and suitable for higher education contexts, making them appropriate for examining students' perceptions of AI-enhanced digital games in English grammar learning.

2.4. Data Collection Procedures

Data were collected in two stages

Phase 1: Questionnaire Administration

The survey was administered to students online or in hard-copy form during regular classes. Respondents were informed of the objective of the study with a guarantee of anonymity and confidentiality. Filled-out questionnaires were collected and classified for statistical data analytic purposes.

P**hase 2: Structured Interviews**

Following the analysis of the questionnaire responses, participants who reported regular engagement with AI-enhanced digital games were selected for structured interviews. Interviews were carried out in person or through video conferencing based on the availability of participants. Recorded responses were later transcribed for analysis.

2.5. Data Analysis

2.5.1. Quantitative Data Analysis

Data from the questionnaire were coded and analyzed using descriptive statistics such as frequencies and percentages. These analyses helped identify

- The most frequently used AI-enhanced digital games (RQ1);
- Learners' overall perceptions toward these tools (RQ2);
- The reported impact on learning outcomes (RQ3).

Results were presented in tables for clarity.

2.5.2. Qualitative Data Analysis

Interview transcripts were analyzed using thematic analysis. Responses were read repeatedly, coded, and grouped into emerging themes. This analysis provided insight into

- The challenges learners experienced (RQ4);
- Learners' recommendations for overcoming these challenges (RQ5).

To ensure credibility, for example, themes were reviewed and refined to reveal coherent patterns among respondents.

2.6. Ethical Considerations

The study was carried out observing ethical guidelines. The participation was voluntary, consent was informed, and the confidentiality as well as the right to withdraw were maintained. All information gathered was strictly used for academic purposes.

3. RESULTS

3.1. Questionnaire Analysis

Learners' Use & Experience with AI Grammar Games This table shows which AI grammar apps were used by students. ChatGPT grammar tasks were the most used (90%), followed by Duolingo (73%) and GrammarlyGO (63%). Quizlet and Kahoot were used by roughly half of the students. Among the listed apps, Elsa Speak had the lowest usage rate

at 39%. These findings indicate that AI-assisted writing and grammar correction applications (ChatGPT, GrammarlyGO) are much more popular than pronunciation-oriented tools.

Table 1: AI-Enhanced Grammar Games Used.

App / Platform	Frequencies	Percentage
Duolingo	110	73%
Elsa Speak	58	39%
ChatGPT grammar tasks	135	90%
GrammarlyGO	95	63%
Kahoot (AI-generated questions)	82	55%
Quizlet (AI grammar sets)	76	51%

Table 2: Frequency of Using AI-powered Grammar Games.

Options	Frequencies	Percentage
Never	12	8%
Rarely	22	15%
Sometimes	66	44%
Often	41	27%
Always	9	6%

As Table 2 indicates, most students claimed to use AI grammar games sometimes (44) or frequently (27%). Only a small number use them all the time (6%)—or never (8%). This suggests that AI grammar tools are somewhat commonly but not consistently used in students' language learning by most of the students.

Table 3: Main Purposes for Using AI-Enhanced Grammar Games.

Options	Frequencies	Percentage
Improving grammar accuracy	47	31%
Getting immediate feedback	32	21%
Practicing grammar through fun challenges	38	25%
Preparing for exams	18	12%
Enhancing overall English proficiency	15	10%

As Table 3 demonstrates, the main aim for using AI-enhanced grammar games by students is to achieve better grammar accuracy (31%).

A quarter of students use AI to learn grammar more enjoyably (25%), and 21% for immediate feedback. 12% of students use AI grammar games specifically for test preparation, while 10% of them use these games for general English improvement.

The results suggest that targeted skill improvement, not exam pressure, drives AI usage.

Table 4: Overall Experience.

Rating	Frequencies	Percentage
Very positive	39	26%
Positive	74	49%
Neutral	26	17%
Negative	9	6%
Very negative	2	1%

Table 4 demonstrates that the overall attitudes toward AI grammar games are highly favorable. Almost half of the participants (49%) had a positive view, and 26% of them had a very positive one.

Only 7% had negative or extremely poor experiences.

This demonstrates that students seem to accept AI tools for grammar learning, and very few of them have negative feelings toward it.

As shown in Table 5, most students (62%) perceived the AI grammar tool as easy to use or very easy to use. A quarter were neutral, and only 13% reported difficulty.

This suggests that AI platforms are, overall, easy to use and not too difficult to use, though a small

number of learners still face challenges.

Table 5: Ease of Use.

Rating	Frequencies	Percentage
Very easy	28	19%
Easy	64	43%
Neutral	38	25%
Difficult	15	10%
Very difficult	5	3%

Table 6: Students' Views on AI Grammar Games.

Likert Scale: 1 = Strongly Disagree, 5 = Strongly Agree

Item	1	2	3	4	5
6 – Fun & motivating.	6 (4%)	12 (8%)	24 (16%)	71 (47%)	37 (25%)
7 – Clear explanations & feedback.	9 (6%)	21 (14%)	39 (26%)	58 (39%)	23 (15%)
8 – Adjusts to my pace & needs.	12 (8%)	27 (18%)	37 (25%)	50 (33%)	24 (16%)
9 – Increases confidence.	7 (5%)	16 (11%)	28 (19%)	66 (44%)	33 (22%)
10 – Prefer games over traditional learning.	11 (7%)	18 (12%)	32 (21%)	56 (37%)	33 (22%)

Table 6 shows that students have a positive attitude toward AI-based grammar games in general. Most students indicated that the games were motivating and fun, with many responding to statements according to "Agree" (47%) and "Strongly Agree" (25%). Responses regarding the clarity of explanations and feedback provided by the games were also overall very positive; 39% agreed and 15% strongly agreed. Perceptions of adaptability were somewhat more varied. Although one-third of students agreed that the games adjusted to their pace (33%), a notable portion remained neutral (25%) or disagreed (18%). Confidence-building was viewed favorably: 44% agreed and 22% strongly agreed that the games increased their confidence. Finally, students also tended to prefer AI grammar games over traditional learning, with 37% agreeing and 22% strongly agreeing. A relatively small proportion disagreed strongly (7%). Overall, students in the Section 2 feedback responses clearly show a broad, positive trend toward enjoyment, clarity, and motivational effects of AI grammar games.

Table 7: Impact on Grammar Learning.

Likert Scale: 1 = Strongly Disagree, 5 = Strongly Agree

Item	1	2	3	4	5
11 – Understanding grammar rules.	6 (4%)	13 (9%)	28 (19%)	69 (46%)	34 (23%)
12 – Remember grammar better.	10 (7%)	20 (13%)	37 (25%)	54 (36%)	29 (19%)
13 – Accuracy improved.	8 (5%)	18 (12%)	32 (21%)	60 (40%)	32 (21%)
14 – Use grammar correctly when writing	9 (6%)	17 (11%)	36 (24%)	59 (39%)	29 (19%)
15 – Learn faster with games	13 (9%)	22 (15%)	35 (23%)	50 (33%)	30 (20%)

Table 7 reveals that students reported major learning benefits from utilizing AI grammar games. 46% said that the games helped them understand grammar rules, while 23% strongly agreed. Many learners reported improvements in their retention of vocabulary and grammar: 36% of the students said that they remembered grammar better after playing the games, with a further 19% strongly agreeing. There was also widespread recognition of grammatical accuracy gains, with 40% saying they agreed and a further 21% that strongly agreed. Most students also indicated that the game(s) helped with proper use of grammar in writing (as 39% agreed and 19% strongly agreed.) Positive attitudes were also observed in perceptions of the learning speed, with one-third (33%) agreeing that they learned grammar more quickly and a further 20% strongly agreeing. agree. Overall, these findings show that students believe that AI grammar games were good for helping them understand, remember, and use grammar better.

Although the general attitudes about AI grammar games are positive (see Table 8), students mentioned some challenges related to those games. A substantial group of students had difficulties using the games, as 29% were neutral against them and 34% disagreed or strongly disagreed.

A key barrier arose due to technical and online issues, with the majority (42% agreed; 25% strongly agreed) indicating that problems with connections increased the difficulty of game use. This challenge was the most agreed on of any item.

Table 8: Challenges Students Face When Using AI Games.
Likert Scale: 1 = Strongly Disagree, 5 = Strongly Agree

Item	1	2	3	4	5
16 – Difficulty in using games use	22 (15%)	28 (19%)	44 (29%)	37 (25%)	19 (13%)
17 – Technical issues/internet problems	6 (4%)	12 (8%)	31 (21%)	63 (42%)	38 (25%)
18 – Unclear explanations	17 (11%)	26 (17%)	40 (27%)	41 (27%)	26 (17%)
19 – It's hard to stay focused.	21 (14%)	28 (19%)	40 (27%)	35 (23%)	26 (17%)
20 – Mismatch of game content	18 (12%)	22 (15%)	39 (26%)	41 (27%)	30 (20%)

Artificial intelligence explanations were confusing to some students—27% agreed and 17% strongly agreed, while another 27% were neutral. It was also relatively difficult to maintain focus (responses spread across neutral (27%), disagree (19%), and agree (23%)).

Finally, appropriateness at the content level was more ambivalent, as 27% agreed and 20% strongly agreed that the content did not correspond to their level, but also 26% were indifferent. Overall, Section 4 indicates that technical issues and clarity of AI explanations are the most substantial constraints on student experiences.

Table 9: Suggestions for Improving AI Grammar Games.
Likert Scale: 1 = Strongly Disagree, 5 = Strongly Agree

Item	1	2	3	4	5
21 – Need more features	7 (5%)	14 (9%)	28 (19%)	63 (42%)	38 (25%)
22 – Should be more effective	6 (4%)	10 (7%)	29 (19%)	67 (45%)	38 (25%)
23 – More interactive & engaging	5 (3%)	9 (6%)	22 (15%)	68 (45%)	46 (31%)
24 – Clearer explanations needed	7 (5%)	13 (9%)	26 (17%)	67 (45%)	37 (25%)
25 – Better level-matching	8 (5%)	15 (10%)	27 (18%)	64 (43%)	36 (24%)

According to Table 9, students expressed strong opinions about improving AI grammar games. A majority (42% agree; 25% strongly agree) stated that more helpful features were needed. Effectiveness was another major point of improvement, with 45% agreeing and 25% strongly agreeing that the games should be more effective.

Most participants supported the necessity for enhanced interactive and engaging game designs, with 45% in agreement and 31% in strong agreement, indicating one of the highest levels of consensus in the survey. Feedback clarity was highlighted, with 45% of respondents agreeing and 25% strongly agreeing that explanations require greater clarity.

Students highlighted the significance of precise level-matching, with 43% agreeing and 24% strongly agreeing that the difficulty level should more accurately align with learners' abilities. Overall, Section 5 highlights students' desire for greater interactivity, improved clarity, expanded features, and better personalization.

3.2. Analysis of Structured Interview

Data in this study were collected from interviews with 15 Saudi undergraduate students and analyzed through inductive thematic analysis. Five major themes emerged

1. Positive learning experiences with AI grammar tools,
2. Increased motivation and engagement,
3. Perception of increased understanding and performance in grammar,
4. Difficulties in utilizing AI grammar games, and
5. Recommendations for improving AI grammar learning tools.

Below, we describe each theme with its subthemes along with some illustrative quotes.

3.2.1. Theme 1: Positive Learning Experiences Using AI Grammar Tools

Subtheme 1.1: Convenience and Accessibility

Most students said that AI grammar tools were readily available, user-friendly, and useful for fast learning." Students liked that they could now practice the grammar at any time and receive assistance instantaneously.

Illustrative quotes

"I primarily utilize ChatGPT and Duolingo." They assist me in swiftly verifying my grammar. "GrammarlyGO rapidly elucidates my errors, thereby conserving time." (L 3)

Subtheme 1.2: Engaging and Enjoyable Learning Format

Gamified components motivated students to engage with grammar in a manner they deemed

more pleasurable than conventional learning.

Illustrative quotes:

"Quizlet and Kahoot are enjoyable due to their game-like nature." (L2)

"AI games are more fun to play than reading rules in a book." (L7)

Interpretation

The students' descriptions indicate favorable user experiences and a willingness to embrace AI tools as stimulating substitutes for conventional grammar exercises.

3.2.2. Theme 2: Higher Motivation and Engagement

Subtheme 2.1: Competition Motivation and Performance Monitoring

Participants reported being more engaged when game mechanics like levels, points, and progress indicators were integrated into the program interface.

Illustrative quotes:

"I feel motivated because I can see my progression and scores. (L7)

"The challenges motivate me to enhance my abilities." (L8)

Subtheme 2.2: Lower Boredom in Learning Grammar

Grammar—a subject often seen as tedious—felt more enjoyable when presented through AI games.

Illustrative quotes:

"Games with artificial intelligence make grammar less boring, thereby enhancing my study engagement." (L6)

"It's a game, so it's easier to concentrate." (L9)

Interpretation

Students' feedback indicates that AI grammar games enhance participation by converting grammar exercises into pleasant and competitive activities.

3.2.3. Theme 3: Enhanced Grammatical Proficiency and Comprehension

Subtheme 3.1: Explicit and Prompt Feedback

Students mentioned that immediate feedback facilitated prompt error correction and enhanced their comprehension of grammar rules.

Illustrative quotes:

"The immediate feedback enables me to correct errors promptly." "It provides examples that explain the rule." (L10)

Subtheme 3.2: Increased Confidence and Competence

Some students said AI tools made them more comfortable using grammar in writing and speaking.

Illustrative quotes:

"I am more confident with my writing essays." (L13)

""It enhances my comprehension of grammatical rules." (L12)

Interpretation

AI grammar tools seem to enhance self-efficacy, facilitating both understanding and practical application of grammar.

3.2.4. Theme 4: Challenges in Utilizing AI Grammar Games

Subtheme 4.1: Technical and Internet-Related Problems

Commonly cited as a challenge were intermittent internet connections and technical difficulties.

Illustrative quotes:

- Internet issues sometimes interrupt the activity." (L14)
- "If the connection is slow, the game doesn't work well." (L10)

Subtheme 4.2: Ambiguity in AI Feedback and Explanations

Some students felt the AI-generated explanations were either too advanced or too vague.

Illustrative quotes:

"There are some explanations that aren't clear to my comprehension level." (L2)

"Sometimes the feedback is confusing." (L7)

Subtheme 4.3: Difficulty Maintaining Focus

But even with gamification, some students had trouble staying on task during longer activities.

Illustrative quotes:

"I tend to get easily distracted when games are too long." (L7)

"I find it hard to keep my mind on what I'm doing sometimes." (L10)

Subtheme 4.4: Discrepancy Between Difficulty and Proficiency of the Participants.

Students observed that certain games were too simple and others were too complex.

Illustrative quotations:

"Some of the tasks are too easy or too hard." (L10)

"The level doesn't always represent my abilities." (L2)

Interpretation

Technical issues, vague feedback, and absence of customization reduce the utility of AI grammar tools.

3.2.5. Theme 5: Recommendations for Enhancing AI Grammar

Subtheme 5.1: Increase Personalization and Adaptability

Students said they wanted tools that adapt easier to their level of grammar and how fast they were learning.

Illustrative quotes:

"Make the levels more personalized." (L5)

"It will suit my level more accurately." (L14)

Subtheme 5.3: Enhancing the Clarity of Explanations

Numerous students requested more simplified, clear grammar explanations.

Illustrative quotes:

"Use an explanation in simple English." (L11)

"The commentary just has to be a little bit clearer." (L3)

Subtheme 5.4: A Local Cultural Context

A few students recommended adding examples that reflect Saudi culture.

Illustrative quotes:

""Incorporating more examples pertinent to the Saudi context." (L3)

Subtheme 5.5: Implementing offline features

Students suggested implementing offline features to address connectivity challenges.

"Offline mode would be beneficial when internet connectivity is slow." (L14)

Interpretation

The recommendations of participants indicate a need for better explanations, more adaptive learning based on questions, greater interactivity, and culture-specific content.

3.2.6. Summary of Thematic Findings

Results of the analysis show that Saudi university students generally find AI-based grammar games useful, motivating, and helpful in developing their grammar skills. Key features include instant feedback, convenience, and a gamified and entertaining learning experience. Nonetheless, learners face numerous obstacles, such as ambiguous feedback, technical difficulties, and restricted customization. Their recommendations were focused on better adaptability, more understandable explanations, increased simulations, and culturally relevant examples.

4. DISCUSSION

The findings of this study provide insights about the ways Saudi EFL students perceive and experience AI-embedded digital games in developing grammar. Overall, the students' attitudes towards AI grammar supports are generally positive in that such technologies would be potentially applied to persistent problems in grammar teaching. This aligns with earlier research emphasizing the motivational and engaging qualities of digital games in language learning (Hashim et al., 2019; Rahmani, 2020) and supports the argument that AI can provide the personalized, immediate feedback often missing in traditional teaching approaches.

Quantitative results showed that students frequently used ChatGPT and GrammarlyGO to become more accurate, receive feedback, and practice grammar from an interactive approach. These findings not only confirm the growing relevance of AI-based applications in language learning but also reinforce studies highlighting the benefits of gamified and adaptive learning environments (Yaccob, 2022; Salmanova, 2025a). Participants' high contentment concerning transparency, motivation, and providing certainty as well as confidence in gameplay reflects a transformation of the learning experience from rule-focused to (activity-)unfolding and (student-)centered attention within grammar practice enabled by AI-embedded games.

The interview data provide a clearer picture of how these tools support rich learning experiences. Students also felt that the convenience and availability of AI platforms were appealing to them, as they could practice at any time outside class and receive immediate feedback, which helped them better understand the grammar rules. These issues resonate with extant theorizing about self-regulating learning and the importance of feedback and learner control within it.

Gamification features such as scores, levels, and challenges were especially successful in keeping the participants motivated, which corroborates early findings of motivational workings of game-based learning (Poondej & Lerdpornkulrat 2016; Wang & Lieberoth 2016).

In a learning experience, learners gain better knowledge and retentive effects, rectifying errors correctly more often with greater confidence to apply grammatical rules both quantitatively and qualitatively speaking. These results are in line with previous research, which also found comparable improvements in learners' performance through playing game-based grammar (Hashim, 2019; Tamayo et al., 2023). Students' feelings of having "learned faster" and having "better remembered grammar" with games enriched by AI further confirm the pedagogical potential of adaptive feedback-rich environments such as AI systems, which are best poised to provide them. The lack of focus and the reflections on content relevance versus learners' actual ability level contribute to underlining design limitations and adaptivity. These issues resonate with some of the wider criticisms in the literature that unrefined use of gamification or lack of personalization may lead to a reduction in instructional benefit being derived from digital

games. While more interactivity, clearer explanations, better adaptive support, and culturally appropriate example sentences were requested by students, they highlight that there is ongoing work in improving AI grammar tools.

In sum, the findings of this study are consistent with prior work that used AI-enhanced gamified learning, improving engagement and grammar performance substantially. But the research also highlights that AI tools are only as effective, to a large extent, as they are usable and instructionally clear, including in terms of personalization. Although these games can lend themselves to significant benefits from AI, the potential of such games is only maximized when technical challenges, content alignment, and user experience design are properly handled. By doing so, the study offers fresh insights into the role of AI in grammar teaching and learning, on both the potential side as well as its practical constraints in view of the Saudi EFL background.

5. STUDY LIMITATIONS

Despite its contributions, this study has several limitations that should be acknowledged when interpreting the findings. The research relied primarily on self-reported questionnaire and interview data, which capture learners' perceptions rather than objectively measured gains in grammatical competence. The absence of pre- and post-testing or a control group limits the ability to establish causal relationships between the use of AI-enhanced digital games and grammar development. In addition, the sample was confined to Saudi EFL university students, which may restrict the generalizability of the results to other educational contexts, proficiency levels, or cultural settings. The cross-sectional design and relatively short data-collection period further preclude examination of long-term learning outcomes and sustained grammar retention. Moreover, the uneven use of different AI tools makes it difficult to isolate the effects of specific platforms or features. Finally, technical issues and occasional lack of clarity in AI-generated feedback may have influenced learners' engagement and responses.

6. PEDAGOGICAL IMPLICATIONS

The implications of this study's findings are also important for EFL pedagogy, with respect to the implementation of AI-driven digital games in grammar instruction. First, then being used as a substitution for the traditional form of teaching, EFL teachers are recommended to integrate AI-grammar games into their class as additional teaching tools. These tools could offer learners further practice, quick feedback and personalised learning paths that can complement classroom instruction and help to cement grammatical concepts. Second, the positive learner perceptions for motivation engagement and confidence suggested that gamified AI applications can help alleviate anxiety in grammar learning. Teachers could use scores, levels or challenges to create sustained engagement for learners, and particularly for those who do not fare well with rule-based grammar pedagogies. Third, the difficulties reported emphasize the importance of pedagogical guidance when applying AI-enhanced games. Educators should support learners in choosing tools that are appropriate to their abilities and scaffold when AI explanations are incomprehensible or too complex.

Open classroom discussion about how to understand the feedback it gives can contribute to learners' metalanguage and avoid misinterpretation. Fourth, educational institutions, curriculum designers and educators need to investigate how AI-enhanced grammar tools might correspond with course aims and local culture. Cultural examples and context-delimited materials will promote understanding of the material learned and learners' acceptance, particularly in EFL settings such as Saudi Arabia. Finally, professional development should be provided to the teachers, so they are capable of successfully implementing AI-based gamified tools in their teaching practices. Training needs to emphasize tool evaluation, alignment with pedagogy, ethical issues and establishing balance between technology dependency versus human instruction.

At the classroom level, AI-enhanced digital games can be integrated as supplementary grammar practice activities both inside and outside the classroom. For example, instructors may use platforms such as Duolingo or Quizlet to reinforce specific grammar points through short, gamified exercises assigned as homework or in-class warm-up activities. These tools allow learners to practice grammar in an engaging way while receiving immediate feedback, which can help consolidate understanding and reduce anxiety associated with grammar learning. In addition, AI-powered tools such as ChatGPT and GrammarlyGO can be incorporated into guided writing and grammar feedback activities.

Teachers may encourage students to analyze AI-generated feedback, reflect on recurring grammatical errors, and discuss corrections collaboratively in class. Gamified elements such as scores, progress

indicators, and challenges can also be strategically used to increase motivation and sustain learner engagement. When integrated thoughtfully and supported by teacher guidance, AI-enhanced digital games can complement traditional instruction and foster a more interactive, learner-centered grammar learning environment.

7. FUTURE RESEARCH DIRECTIONS

While this study has contributed to a better understanding of EFL learners' attitudes toward AIEDGs for learning grammar, future research can be extended along several dimensions. First, future research might conduct experimental or quasi-experimental studies to look at how the causal impact on grammar learning between AI-based grammar games and traditional instruction differed in other specific aspects.

Second, future longitudinal study is needed to further examine the sustained effects of AI-based games on grammar retention, accuracy, and transfer effect. Such studies would better inform whether plausible benefits materialise into long-term learning. Third, further studies are needed to explore teachers' perceptions of EFL AI-enhanced digital games (e.g., their readiness, attitudes, and challenges in implementing the tool into EFL classrooms). A full account of the impact and participants' perspectives, specifically of both learners and instructor role, would give a more complete picture in AI grammar tutoring.

Fourth, based on comparisons of different proficiency levels, age group or cultural context, the investigation into the impact of learners' characteristics over the effectiveness and attractiveness to AI-supported grammar games should be carried out. Finally, future studies should explore some AI-enhanced games' design affordances, like adaptivity, feedback quality or gamification elements to identify which of them pitches in best to learning grammar. Insights from such work could be used to improve AI grammar applications in a pedagogically sounder and learner-centerd manner

8. CONCLUSION

The present study explored the attitudes of Saudi ESL university students towards AI-supported digital games as tools for supporting English grammar practice and sheds light on learners' use, perceptions, learning gains, and challenges. Across both the quantitative and qualitative findings, students emphasized their favorable perception of the motivational and instructional benefits AI grammar tools can provide. These apps, especially ChatGPT, GrammarlyGo, Duolingo, Kahoot, and Quizlet, were perceived as accessible and engaging while exerting a positive influence on grammar acquisition. The post-surveys of the students showed a better understanding of grammar rules, use of structures in their compositions, memorization, and confidence (AI-enhanced games can potentially work as a complementary supplement to traditional teaching).

The study answered its research questions by showing that students use these tools a lot to improve specific skills, and they like the immediate feedback and interactivity in these applications. It means that games with AI implementation reinforce the motivation to learn and engage with gamified features and support autonomous learning through convenient learning options and immediate feedback. At the same time, learners pointed to a variety of impediments—such as technical restrictions, ambiguous instruction, and ill-fitting difficulty levels—that restrict how effective the tools can be. They suggest that there are opportunities to advance AI-based grammar learning tools by providing greater personalization, clearer feedback, increased interactivity, and content culturally in the context of the student. This type of research could be further developed by focusing on AI in a classroom-integration context, examining the long-term effect on performance, or testing the effectiveness of specific AI tools. Considering that such artificial intelligence is being spread around the corner, using it for language learning education can play a crucial role in enhancing learners' grammatical capability and their desired experience with EFL.

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