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Exploring the Impact of ChatGPT on Vocabulary Acquisition in EFL Learners: A Mixed-Methods Study on AI-Assisted Language Learning

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ABSTRACT

This study explores the effectiveness of ChatGPT, an AI-powered language model, is in helping EFL learners improve their vocabulary. Over five weeks, 50 female university students participated in a mixed-methods study that included Vocabulary Knowledge Scale (VKS) pre- and post-tests, as well as semi-structured interviews. The quantitative results showed a statistically significant improvement in vocabulary knowledge after using ChatGPT. The percentage of words rated as "very familiar" more than doubled, while the percentage of unfamiliar words decreased noticeably. A paired samples t-test confirmed that these gains were statistically significant ($p = 0.006$). To analyze the qualitative data, the study used thematic analysis approach. Key themes emerged: increased student engagement, practical benefits of ChatGPT, and concerns about overreliance on the tool. Students appreciated the quick responses and helpful examples, but also noted that some information was inaccurate or overwhelming. Overall, the findings suggest that ChatGPT can be a valuable tool for vocabulary learning, offering immediate support and contextual understanding. However, its limitations highlight the need for critical thinking and teacher guidance. This study adds to the growing research on AI in language education and provides practical insights into how tools like ChatGPT can be used effectively and responsibly in EFL classrooms.

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1. Introduction

AI has revolutionized language acquisition by introducing tools designed to enhance educational experiences in both teaching and learning. Among them is ChatGPT, an AI tool that has become useful in fostering the motivation of language learners through more engaging and personalized means. Recent studies have shown that ChatGPT significantly increases student participation and offers immediate feedback—a critical need for EFL learners who often require real-time support and correction. ChatGPT can bridge gaps in engaging discussions, personalized content delivery, and timely feedback—features often lacking in traditional classroom instruction. Traditional classroom environments often cause student frustration due to limited opportunities for practice and feedback.

This study aims to examine ChatGPT's effectiveness in enhancing vocabulary acquisition—a crucial aspect of language learning that greatly contributes to overall proficiency. Vocabulary lies at the heart of both language comprehension and expression, and the ability to master it has a great impact on learners' confidence and fluency. Although recent literature highlights ChatGPT's potential to generate summaries, quizzes, and flashcards that reinforce learning, several concerns remain—particularly regarding its reliability, the risk of plagiarism, and the ethical implications of overreliance on AI. This paper addresses these gaps by evaluating how effectively ChatGPT enhances vocabulary development in EFL learners, drawing on recent studies that examine its benefits and limitations. The results will give educators and policy-makers further clarity on how AI can be leveraged to maximize improvements in learning outcomes and help develop better teaching strategies in the future.

This paper situates GPT chatbot within a wider cultural and historical context and provides nuance regarding the role of AI in modern education and its possible support of lifelong language learning. Accordingly, this study seeks to answer the following research questions, which explore the extent, perceptions, and impact of ChatGPT usage on EFL learners' vocabulary acquisition. The study addresse the following research questions:

1) To what extent does ChatGPT help in developing students' vocabulary?
2) What are the perceptions of students when using ChatGPT in learning vocabulary?
3) What challenges do students face when using ChatGPT?

2. Literature Review

2.1. The Use of ChatGPT in Higher Education

The integration of artificial intelligence (AI) in educational contexts has opened new avenues for enhancing language learning, particularly in the acquisition of vocabulary for English as a Second Language (ESL) and English as a Foreign Language (EFL) learners. Information and Communication Technology (ICT) applications have been shaping the field of Computer Assisted Language Learning (CALL) in the last few decades. Mobile Assisted Language Learning (MALL) paved the way for ubiquitous learning which now largely involves the use of AI tools such as ChatGPT [1]. Among the various AI-driven tools, ChatGPT, developed by OpenAI, has garnered significant attention for its potential to support and enhance the language learning process. For example, ChatGPT could provide personalised language instruction or generate authentic language material for learners to engage with [2].

This literature review explores the effectiveness of ChatGPT in vocabulary development by examining its impact on learners, their perceptions, and the challenges they face during the process. In a study by Tugba Aydın Yıldız involving 60 second-year students using the 'Motivational Strategies for Learning Questionnaire,' researchers found significant differences between majors in motivation subcategories (self-regulation, intrinsic values, and test anxiety), suggesting that using ChatGPT as a learning tool increased student motivation [3]. The use of AI in language learning is not a novel concept; however, recent advancements have led to more sophisticated applications that can simulate human-

like interactions and provide personalized learning experiences. One study examined how ChatGPT, a revolutionary AI-powered chatbot, affects students' educational experiences. Researchers collected data from 516 students who used ChatGPT for academic assignments and analyzed the data using seemingly unrelated regression (SUR)[4]. These studies have highlighted the benefits of AI tools in language education, emphasizing their ability to create dynamic and interactive learning environments. These tools offer learners opportunities to engage with language content in ways that traditional methods may not provide, such as through real-time feedback and adaptive learning pathways. Hybrid learning, which became more prevalent after the COVID-19 lockdown, increasingly incorporates AI tools. Studies have reported that AI significantly increases student engagement in hybrid learning settings[5]. One study investigated ChatGPT's role in personalized learning, assessment, and content creation, and examined its limitations and ethical implications. The study concludes that ChatGPT can be effectively integrated into education to automate routine tasks and enhance the learning experience for students, ultimately increasing productivity and efficiency and fostering adaptive learning[6] .

2.2. ChatGPT and Language Learning

ChatGPT has been recognized for its capacity to assist learners in understanding and applying new vocabulary. In today's AI-enhanced language classrooms, learners' emotions and mindset play a major role in how they engage with the learning process. Liu and Fan showed that when students feel supported by their teachers and enjoy the learning experience[7], they are more likely to participate actively, especially when they feel confident using AI tools. Their study emphasizes the importance of fostering both emotional well-being and digital literacy to cultivate a positive, productive language learning environment. In a study conducted in Saudi Arabia, Ali demonstrated that ChatGPT positively influences university students' vocabulary acquisition[8]. A similar study employed a questionnaire-based method in which participants provided feedback after completing tasks related to formal English language learning with ChatGPT, including conversation, writing, grammar, and vocabulary activities. The findings suggest that ChatGPT is an effective tool for formal English language learning and contributes to the growing body of research on emerging educational technologies. The study found that students who used ChatGPT showed significant improvement in their ability to understand and apply new vocabulary in context[9]. Similarly, Kasneci et al. noted that ChatGPT's interactive nature enables learners to generate, edit, and refine texts, thereby enhancing their vocabulary acquisition and overall language fluency[10]. Recent work by Zhang et al. sheds light on an important yet often overlooked aspect of using AI tools in language learning: how students feel about and interact with these technologies[11]. Their study found that EFL learners' willingness to communicate in English was strongly influenced by how confident they felt using AI (their AI learning self-efficacy) and how anxious they were in the classroom. In other words, the emotional and experiential aspects of using tools like ChatGPT play a critical role in their effectiveness. These findings highlight the need for thoughtful integration of AI in the classroom, where building students' digital confidence and reducing anxiety go together with language skill development[11].

2.3. ChatGPT and Vocabulary Learning

The current study's findings align with the broader body of literature indicating that ChatGPT plays a significant role in vocabulary development. The quantitative data from the Vocabulary Knowledge Scale (VKS) revealed statistically significant improvements in students' vocabulary familiarity after the intervention with ChatGPT. These results are consistent with the studies by Kohnke et al. and Shaikh et al.[9,12], which reported similar outcomes in language fluency and vocabulary expansion using AI-driven tools like ChatGPT.

Athanassopoulos et al. further support these findings, demonstrating the effectiveness of ChatGPT in improving students' ability to acquire, reuse, and repeat vocabulary[13]. The ability of ChatGPT to provide contextualized examples and prompt students to engage in meaningful language use appears to be a key factor in its success[13]. Mugableh similarly highlights ChatGPT's role in linking vocabulary to meaning across contexts and facilitating its reuse in new situations[14].

Student perceptions of using ChatGPT for vocabulary learning are generally positive, with many appreciating the personalized feedback and interactive nature of the tool. However, researchers also identify several challenges as-

sociated with its use. Ali found that while students valued the immediate feedback and the ability to practice vocabulary in a low-pressure environment[8], some expressed concerns about over-reliance on AI, which could potentially diminish the role of traditional educational methods. This aligns with the findings of Shaikh et al., who caution against using ChatGPT as a substitute for formal education, recommending instead that it be integrated into a broader, teacher-led curriculum[9].

Despite its benefits, ChatGPT presents several challenges in vocabulary learning. These challenges include issues related to the accuracy of the AI's responses, cultural relevance, and the potential for the tool to reinforce incorrect language usage if not monitored carefully. Researchers utilized ChatGPT to generate academic texts and paragraphs across various genres in response to text-based academic queries. They then critically analyzed the texts using a set of proposed framework principles. Mahyoob found that despite ChatGPT's impressive capabilities, its outputs contained significant flaws, highlighting issues in academic writing[15]. The primary concerns identified include repeated information, inaccurate inferences, flawed reasoning, fabricated references, hallucinations, and a lack of pragmatic interpretation. The results of another study indicated that ChatGPT delivers instantaneous responses to search queries, as well as automatic text production that resembles conversational responses, but also pointed out difficulties such as missing citations and references, which are essential for learning—particularly in written language[16]. A synthesis of data from 51 articles revealed 32 topics, including 13 strengths, 10 weaknesses, five opportunities, and four threats related to ChatGPT's use in education. The findings underscore the need for teacher involvement to mitigate these risks and ensure ChatGPT supplements, rather than replaces, direct instruction[17] Mugableh also notes that ChatGPT's effectiveness in vocabulary learning improves when paired with traditional, structured teaching methods[14].

The literature overwhelmingly supports the efficacy of ChatGPT in enhancing vocabulary acquisition among ESL and EFL learners. Studies consistently show that ChatGPT not only aids in vocabulary development but also provides an interactive and engaging platform for students to practice and refine their language skills. However, the challenges associated with its use highlight the need for a balanced approach, integrating AI tools like ChatGPT within a comprehensive, teacher-led educational framework. As AI continues to evolve, future research should focus on optimizing the integration of these tools in language learning, ensuring that they complement rather than replace traditional teaching methods.

3. Methodology

3.1. Research Design

This study employed a mixed-methods approach[18], combining both quantitative and qualitative data collection and analysis methods to investigate the impact of ChatGPT on students' vocabulary development, their perceptions of using ChatGPT for learning vocabulary, and the challenges they faced. The research design was selected to provide a comprehensive understanding of the research questions and to triangulate the findings from different data sources.

3.2. Research Participants and Sites

The study involved 50 female university students from the English Language Department at King Saud University. While the sample provides valuable insight into a specific learner group, it limits the generalizability of the findings beyond similar demographic and institutional contexts. The participants were selected using convenience sampling from a larger pool of students enrolled in an English language course[19]. The research site was the university Blackboard system[20], where students had access to computers and the internet to use ChatGPT for their assignments.

3.3. Materials

The primary materials used in this study included:

1) Vocabulary Knowledge Scale (VKS): A survey with 30 vocabulary items, rated on a five-point scale ranging from "Never heard of it" to "Very familiar [21]."
2) Interview Protocol: A semi-structured interview guide was used to collect qualitative data on students' perceptions and challenges related to ChatGPT use.
3) ChatGPT Tool: An AI language model used by students to assist in their vocabulary learning tasks.

3.4. Intervention

The study was conducted over a five-week period, during which 50 female students from King Saud University participated in an intervention focused on enhancing their English vocabulary through the use of AI-based assignments. Each week, after attending a lecture on various aspects of English language learning, students were grouped and assigned tasks generated by ChatGPT, an AI language model. These tasks were specifically designed to reinforce the vocabulary and concepts covered during the lectures.

The AI-generated assignments included a range of question types, such as explaining technical terms, applying vocabulary in specific contexts, and comparing different concepts. The vocabulary tasks used in this study were based on the Vocabulary Knowledge Scale (VKS) developed by Iqbal and Komal, which asks learners to rate how well they know certain words[21]. These tasks were then adjusted to better fit the students' course content and language level. We chose vocabulary that students commonly encounter in their university reading and writing assignments, especially words taken from their textbook units and weekly lectures. The activities included writing sentences using the new words, choosing synonyms or antonyms, and applying the vocabulary in short writing tasks. To make sure the tasks were suitable, two experienced EFL teachers reviewed them and gave feedback on the difficulty, clarity, and relevance of each item. Based on their input, some wording was adjusted to make the tasks more understandable and aligned with the students' learning needs. For example, one assignment asked students to explain spreadsheet terms like "Merge," "Shrink to Fit," and "Lock," demonstrating their understanding by providing practical examples of how these features could be used in real-world scenarios (as seen in AI Assignment—Book 2, Unit 6). Another assignment involved using advanced vocabulary in context, requiring students to create meaningful sentences and explanations (as reflected in AI Assignment Unit 15 Answer Key).

Students were required to collaborate within their groups to answer these questions and compile their findings into a comprehensive presentation. This presentation was then delivered in the following week's session, allowing students to articulate their understanding and receive feedback. The types of answers provided by students varied, with some groups offering detailed and contextually accurate explanations, while others struggled with applying the new vocabulary effectively.

This group-based approach not only encouraged active participation but also facilitated peer learning, as students shared their insights and helped each other understand the material. The intervention effectively utilized AI to create a dynamic and interactive learning environment, fostering both vocabulary development and confidence in using English in academic and practical contexts.

To help students make the most of ChatGPT, we began with a 20-minute orientation session before the study started. During this session, participants were shown how to access and interact with ChatGPT, including how to ask clear questions and use the responses to support their vocabulary learning. We also explained some of the tool's limitations—such as the possibility of inaccurate answers—and encouraged students to think critically about the information they received. They were advised to double-check meanings, compare ChatGPT's suggestions with reliable sources, and discuss any confusing points with their instructor. This preparation aimed to give students the confidence to use the tool effectively and responsibly throughout the study.

3.5. Data Collection Procedures

Quantitative Data Collection: The VKS was administered to the students before and after a period of using ChatGPT for vocabulary learning. The pre-test measured the students' initial vocabulary knowledge, while the post-test assessed any changes after the intervention with ChatGPT. The survey aimed to measure how familiar students were with each vocabulary item. Qualitative Data Collection: The researcher conducted semi-structured interviews with a subset of participants to delve deeper into their experiences and perceptions of using ChatGPT for learning vocabulary. The interviews explored how ChatGPT helped in learning new vocabulary, the ease of use, any difficulties encountered, and the overall satisfaction with the tool. The researcher audio-recorded and transcribed the interviews for analysis.

3.6. Data Analysis Procedures

Qualitative Analysis

The qualitative data were analyzed using thematic analysis as outlined by Braun and Clarke[22]. The process followed six systematic steps: (1) familiarization with the data, (2) generating initial codes, (3) searching for themes, (4) reviewing themes, (5) defining and naming themes, and (6) producing the report.

All interview transcripts were read multiple times to ensure deep immersion in the data. Initial coding was conducted manually by the researcher and involved both deductive codes derived from the study's research questions and inductive codes, which emerged directly from participants' responses. Deductive codes included categories such as "perceived usefulness," "learning motivation," "interaction quality," and "challenges with AI tools." Inductive codes emerged from open coding and included labels like "chatting feels like cheating," "too much information," and "fun to use."

These codes were then organized into broader overarching themes, including:

- Enhanced Engagement and Curiosity: capturing learners' increased motivation and interest.
- Trust and Skepticism: reflecting mixed feelings about the accuracy of responses.
- Autonomy vs. Overreliance: relating to how students used ChatGPT independently, but sometimes leaned on it too heavily.
- Supportive Features of AI: covering perceived benefits such as instant answers, simplified explanations, and helpful summaries.

To enhance credibility and trustworthiness, a second researcher independently coded a subset of the transcripts. The researchers compared and refined coding decisions through consensus meetings. The researchers resolved disagreements through discussion until reaching mutual agreement, which helped reduce individual bias and increase the consistency of theme development.

3.7. Validity and Reliability

Quantitative Validity and Reliability: To ensure the validity of the VKS, the researcher reviewed the vocabulary items with language education experts in the field of language education to confirm the items matched the students' proficiency level and were representative of course vocabulary. The reliability of the VKS was tested using Cronbach's alpha to ensure internal consistency.

Qualitative Validity and Reliability: To enhance qualitative validity, the researcher used triangulation by using multiple data sources (interviews and VKS results). The researcher conducted member checking by sharing interview summaries with participants to ensure the accuracy of the captured data. Inter-coder reliability was established by having two researchers independently code the interview transcripts and then compare the codes for consistency[23].

3.8. Ethical Considerations

The study adhered to ethical guidelines for conducting research with human participants. The researcher obtained informed consent from all participants, ensuring they were aware of the study's purpose, procedures, and their right to withdraw at any time. The researcher maintained confidentiality by anonymizing the data and securely storing all materials.

4. Results

4.1. Quantitative Analysis

The survey contained 30 vocabulary items; it was presented to a group of 50 female students before and after using ChatGPT. The survey included five scale options (Never heard of it, Heard of it but don't know what it means, Know something about it, Quite familiar with it, Very familiar). The scale was used to assess vocabulary improvement in computer-related terms among female students following their use of ChatGPT. Participants demonstrated varying levels of familiarity, proficiency, and mastery, indicating that some vocabulary items were already part of their cognitive and linguistic systems to differing extents.

4.1.1. Results of Pre and Post VKS

The findings showed in **Table 1** a minimum difference of 0.41 between the pre- and post-test means of VKS. There is indeed a significant change in the VKS for the participants as there appears to be an increase in vocabulary understand-

ing and the students demonstrated increased familiarity with the vocabulary. Many words previously unknown to participants became known or were at least in the "Known it before" category. Many participants who knew the meaning of many words and could use them in their study as well. Many participants were able to understand the vocabulary but there were a few who were confused about the correct usage of these words. This indicates that ChatGPT helped participants enhance their vocabulary. Participants learned and became familiar with many vocabulary words that were enhanced while practicing ChatGPT activities.

It is clear from **Table 2** that the percentage of vocabulary items students found "Very familiar" increased from 17.52% before using ChatGPT to 47.93% of the vocabulary. The percentage of vocabulary that the female students have "Never heard of" decreased from 22.55% to 11.70% after using ChatGPT. In addition, vocabulary for which students "Heard of it but don't know what it means" decreased from 20.38% to 7.95%. Finally, vocabulary that they "Know something about it" decreased from 22.03% to 14.71%. These results indicate ChatGPT's effectiveness in improving vocabulary acquisition and comprehension. The following diagram shows this. The trend of vocabulary knowledge growth over the study period is shown in **Figure 1**.

Table 1. Mean and standard deviation of pre and post VKS.

	N	Mean	Std. Deviation	Std. Error Mean
pre	50	3.3638	0.77185	0.10916
post	50	3.7670	0.64733	0.09155

Table 2. Pre- and post-test mean of vocabulary acquisition categories.

Apply	Never Heard of It	Heard of It But Don't Know What It Means	Know Something About It	Quite Familiar With It	Very Familiar
Pre	5.2 22.55%	4.7 20.38%	5.08 22.03%	4.04 17.52%	4.04 17.52%
Post	3.5 11.70%	2.38 7.95%	4.4 14.71%	5.3 17.71%	14.34 47.93%

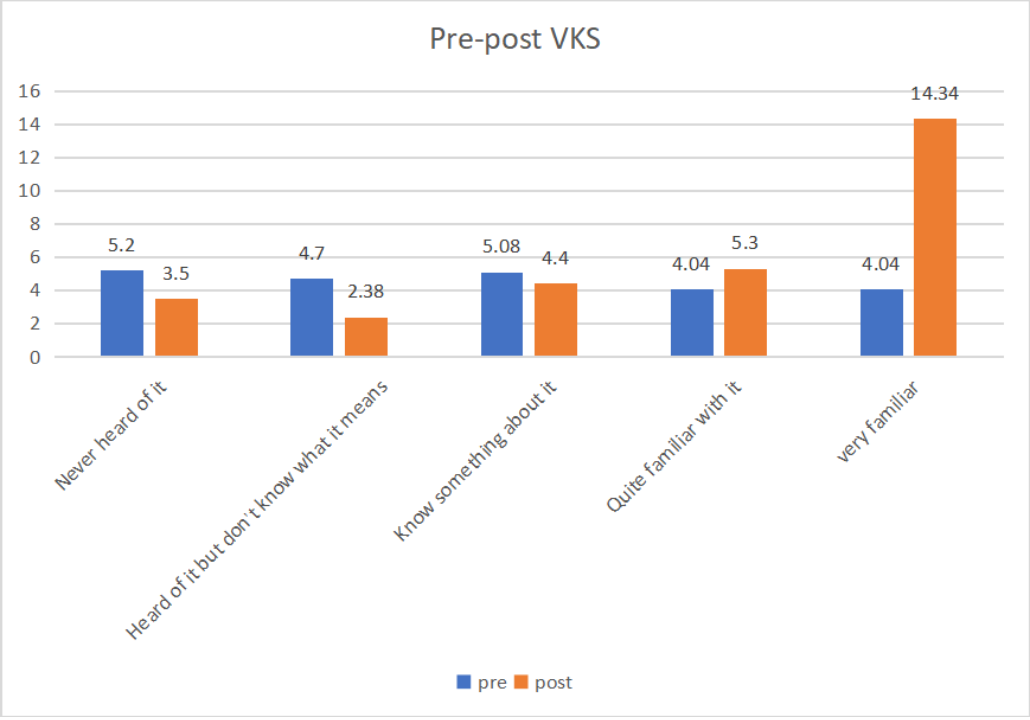

Figure 1. Pre-post vocabulary knowledge scale (VKS) scores for different levels of familiarity with words.

To identify the significance of the differences between the pre- and post-application of the VKS, a t-test was used and the results were as follows:

Table 3 illustrates the statistically significant differences between the pre- and post-test results. The pre- and post-application of the VKS are not less than 0.40, and these differences are statistically significant at a significance level of less than 0.05, with a t-value of 2.857, significant at $p = 0.006$. This indicates the role of ChatGPT in improving vocabulary acquisition and comprehension.

Table 3. T-test to detect the significance of the differences between the pre- and post-application of the VKS.

	Paired Differences					t	df	Sig. (2-tailed)
	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
				Lower	Upper			
pre - post	−0.40320	0.99798	0.14114	−0.68682	−0.11958	−2.857	49	0.006

4.2. Qualitative Analysis

4.2.1. Theme 1: Growth in Vocabulary Knowledge and Familiarity

The Vocabulary Knowledge Scale (VKS) results revealed substantial vocabulary improvement after the use of ChatGPT. Students demonstrated higher familiarity with vocabulary items in the post-test compared to the pre-test. Specifically:

- "Very familiar" vocabulary increased from 17.52% to 47.93%.
- "Never heard of it" dropped from 22.55% to 11.70%.
- "Heard of but don't know the means" decreased from 20.38% to 7.95%.

These changes suggest that ChatGPT effectively supported learners in recognizing and understanding new words, moving many terms from passive recognition to active familiarity.

4.2.2. Theme 2: Statistical Significance of Vocabulary Gains

Quantitative analysis using a paired t-test confirmed that the vocabulary improvements were statistically significant. The average vocabulary gain was no less than 0.41, with a t-value of 2.857 and a significance level of $p = 0.006$. This supports the conclusion that ChatGPT use had a measurable and meaningful impact on vocabulary development.

4.2.3. Theme 3: Perceived Usefulness and Practical Benefits

Students highlighted ChatGPT's speed and ability to deliver detailed responses as major strengths. Many found it useful for immediate vocabulary explanations and enriching their knowledge with contextual examples.

> Reham shared: "*Honestly, what I liked is that it provides a lot of information… more than I need. However, some of it might be wrong… so I need to correct it… or summarize it*."

This reflects students' awareness of both the tool's usefulness and the need for critical evaluation of AI-generated content.

4.2.4. Theme 4: Efficiency Compared to Traditional Tools

Students frequently compared ChatGPT to conventional search engines such as Google. Students appreciated how ChatGPT summarized information and allowed them to get results quickly without extensive browsing.

> Hasna commented: "*It summarizes information better than Google… You can take it, summarize it, and verify the information instead of searching from scratch*."

This suggests that learners found ChatGPT more aligned with their study habits and preferred learning pace.

4.2.5. Theme 5: Individual Differences and Challenges in Use

While the overall response to ChatGPT was positive, a few students did not find it particularly helpful. These responses point to the importance of digital readiness, individual learning preferences, and varying expectations when integrating AI tools into education.

Danah noted: "*Using ChatGPT is not that use-*

ful for me."

This highlights the need to support learners with guidance and training when incorporating new technologies in language education.

Most participants agreed that ChatGPT is useful, emphasizing its speed and accuracy in providing responses. This speed and accuracy of responses greatly enhance the users' experience, as users can quickly get the information they need.

> Reham shared: "*Honestly, what I liked is that it provides a lot of information, not just one or two lines, but a lot more than I need. However, some of it might be wrong, so I need to correct it, or some of it I don't need at all, so I have to summarize it*."

Another student reinforced this view, stating:

> Hasna: "*It summarizes information better than Google and is easier when you want to search for something quickly. You can take it, summarize it, and verify the information instead of searching from scratch*."

In contrast, Danah expressed that ChatGPT was not particularly helpful:

> "*Honestly, in the part where we used ChatGPT, I felt the vocabulary didn't stick in my head as much as when you explained it or when we discussed it with you. It stuck more in my memory*."

> Asma stated: "*I feel it's better not to use it for vocabulary as I didn't remember many terms*."

> Noura commented: "*I found it useful for understanding terms that are hard to find on Google*."

> Haifa added: "*It's beneficial but should not be relied on entirely*."

Despite the advantages of using ChatGPT, there are several challenges raised by the students during the interviews.

> Noura noted: "*I feel if we search in books and find answers, we understand better and the ideas stick more than using ChatGPT to get the answers directly*."

Another student attributed the limitation of using such a technique to the following view:

> Reham shared: "*Maybe because it gave too much information, it was a bit difficult, but the rest was good, and it provided more information than I needed*."

> Rana: *"For me, Doctor, it can help, but mostly, we are now in the age of technology, and technology has advanced. So, we will not stick to books only. I feel it helps in discovering new fields and might assist in cheating, but it depends on how you use it*."

All participants agreed that ChatGPT sometimes generated inaccurate, off-topic, or overly complex responses.

5. Discussion

The findings of this study confirm the effectiveness of ChatGPT in enhancing vocabulary acquisition among EFL learners. The significant differences observed between the pre- and post-test scores suggest that ChatGPT facilitated greater familiarity with and understanding of new vocabulary. These outcomes align with previous studies that have identified ChatGPT as a useful tool for supporting vocabulary development through its ability to present information clearly, offer contextualized examples, and encourage students to reorganize and reinforce their lexical knowledge [24,25].

The tool's adaptability and immediate feedback mechanisms enabled students to explore word meanings, test usage in context, and receive personalized language input. This aligns with studies by Kohnke et al. and Kasneci et al., which emphasized ChatGPT's role in refining students' vocabulary through real-time, adaptive learning experiences [10,12]. Similarly, research by Ali in the Saudi context and Shaikh et al. confirmed that ChatGPT is perceived as a supportive language learning aid that improves both vocabulary breadth and fluency [8,9].

However, while these studies and the current findings demonstrate measurable benefits, they also point to important pedagogical implications. AI-mediated learning environments like ChatGPT introduce a shift in the traditional

teacher-student dynamic. The teacher's role increasingly becomes that of a facilitator or guide, helping students navigate, evaluate, and apply AI-generated content critically. This shift necessitates pedagogical rethinking: instructors must design learning activities that support learner autonomy while ensuring digital literacy and critical awareness are integrated into AI use.

Furthermore, the use of ChatGPT contributes to a more student-centered approach, encouraging learners to take initiative in seeking out explanations, testing language in use, and reflecting on their understanding. This is in line with constructivist theories of learning, which emphasize the importance of active knowledge construction and learner agency. Nevertheless, while ChatGPT can enhance autonomy, it must be embedded within structured learning contexts to prevent overreliance or uncritical dependence on AI outputs [14]. While ChatGPT offers notable advantages for vocabulary acquisition, it also raises ethical concerns, particularly around academic dishonesty. Students may misuse AI-generated content, relying on it to complete assignments without genuine engagement. Such misuse not only undermines skill development but also challenges academic integrity policies. Therefore, it is essential for educators to promote responsible use of AI and foster a culture of ethical learning where tools like ChatGPT are viewed as learning aids, not substitutes for students' own work.

In conclusion, the current study not only supports the growing body of evidence regarding ChatGPT's role in language learning but also highlights the evolving pedagogical landscape shaped by AI tools. As learners become more autonomous and digitally engaged, educators must find a balance between technological integration and instructional support, ensuring that AI serves as a supplement, not a substitute, for informed and reflective learning.

6. Conclusions and Recommendations

This study explored the impact of ChatGPT on vocabulary development among EFL learners using a mixed-methods approach. The results showed significant improvements in learners' vocabulary knowledge after using the tool. Participants reported that ChatGPT helped them better understand new words, practice usage in context, and receive instant feedback. These findings support the growing body of research highlighting the potential of AI-assisted language learning.

However, the study also raised important considerations. While many learners found ChatGPT engaging and useful, some expressed concerns about the accuracy of responses and the possibility of becoming overly dependent on the tool. Ethical concerns particularly related to academic dishonesty—were also noted, suggesting the need for clearer guidelines and digital literacy training to encourage responsible use.

Based on these insights, several recommendations are offered for educators and policymakers:

Firstly, teacher training programs should be updated to include modules on AI tools like ChatGPT. This training should not only demonstrate how to use the tool but also help teachers design assignments that promote critical thinking, reflection, and learner autonomy. Teachers should be equipped to guide students in verifying AI-generated content and integrating it meaningfully into their learning.

Secondly, institutions should develop clear policies outlining acceptable uses of AI in academic settings. These policies should be communicated to both teachers and students to reduce ambiguity and prevent misuse. For example, assignment rubrics could include criteria for originality and proper AI tool usage.

Furthermore, curriculum designers should consider embedding structured AI-based tasks into language programs. These tasks should align with course objectives and include reflection components to ensure students are engaging thoughtfully with the tool.

Educators and policymakers should provide clear guidelines on acceptable AI use in academic contexts. Firstly, institutions should include discussions of academic integrity and AI in their digital literacy programs, helping students distinguish between support and substitution. Secondly, instructors can design assignments that require reflection or personalized responses making unethical reliance on AI more difficult. Finally, continuous monitoring and open dialogue between students and teachers about responsible AI use can reduce misuse and reinforce trust in educational settings.

Finally, digital literacy and academic integrity should be integrated into classroom discussions. Students need to understand both the capabilities and limitations of AI tools

and the importance of using them ethically.

Recommendations for Future Research

Building on the current study's insights into the use of ChatGPT for vocabulary development among EFL learners, several avenues for future research are proposed to deepen understanding and enhance the effective integration of AI tools in language education:

- **Examine Long-Term Effects on Learning Outcomes**
  While this study revealed short-term gains in vocabulary acquisition, future research should investigate the sustainability of these improvements over time. Longitudinal studies could assess retention rates and continued engagement with language learning in the absence of AI support.
- **Extend Research to Other Language Competencies**
  Future studies should expand beyond vocabulary acquisition and explore how ChatGPT influences grammar, writing, reading comprehension, speaking, and listening skills, offering a more holistic picture of AI's impact on language proficiency.
- **Include Diverse Learner Profiles**
  There is value in investigating how AI tools function across different age groups and proficiency levels. For example, studies could compare beginner vs. advanced learners or examine responses among adolescent versus adult learners, as these variables may influence user experience and outcomes.
- **Evaluate Digital Literacy and Ethical Use**
  Given the ethical concerns highlighted in this study, future research should assess students' digital literacy and understanding of responsible AI use. This includes their ability to verify information, avoid academic dishonesty, and reflect on AI-generated content critically.
- **Explore Teachers' Attitudes and Instructional Strategies**
  Research focusing on teachers' perceptions, readiness, and strategies for using AI in language instruction is essential. This can inform professional development programs and address barriers to effective implementation.
- **Monitor Academic Integrity and Policy Impact**
  Further research is needed to assess how the use of AI intersects with issues of academic integrity. Studies should explore the effectiveness of institutional guidelines, honor codes, and curriculum design in minimizing unethical use while encouraging responsible engagement.

These directions offer a foundation for the evidence-based and ethical integration of AI tools like ChatGPT into language learning. As AI continues to reshape educational practices, a research agenda grounded in empirical inquiry, critical reflection, and pedagogical relevance will be vital to ensuring its meaningful and responsible use.

7. Acknowledgment of the Limitations

This study acknowledges several limitations which must be considered when interpreting the findings. First, this sample was limited to female students at just one university—a fact that does not represent the broader student population.

This study focused specifically on vocabulary acquisition and comprehension using ChatGPT; however, an in-depth investigation of other language skills such as speaking, listening, and writing, was not taken into consideration. This limitation restricted understanding ChatGPT's effect as a tool in language skills and proficiency.

The duration of the study was limited. The study lasted five weeks, which may be considered short because language learning is a complex and lengthy process needing longer periods of intervention. Therefore, the duration of this study may have been insufficient to assess the long-term retention and application of the vocabulary learned through ChatGPT.

The study also acknowledges the possible limitations in the reliability and validity of information from ChatGPT. Because ChatGPT is an AI tool, sometimes it may make responses that are contextually wrong or irrelevant; therefore, if not monitored closely, it may confuse learners or reinforce wrong language usage.

Finally, the study did not look into broad ethical implications of using AI in language learning, including over-reliance on technology and the chances for academic dishonesty to take place. Future research should take this into consideration and investigate ways of incorporating AI applications like ChatGPT in a manner that will support traditional teaching while limiting the challenges.

Overcoming such limitations in future studies will pro-

duce a more robust approach toward understanding how AI tools like ChatGPT can be integrated into language education in support of diverse learning needs and contexts.

Author Contributions

Conceptualization, J.A.; methodology, J.A. and R.A.; formal analysis, J.A. and G.S.A.; investigation, R.H.A.; resources, J.A.; data curation, R.A.; writing—original draft preparation, J.A. and R.A.; writing—review and editing, J.A., R.A., G.S.A., and R.H.A.; visualization, G.S.A.; supervision, J.A. All authors have read and agreed to the published version of the manuscript.

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Data Availability Statement

The data that support the findings of this study are not publicly available due to privacy or ethical restrictions.

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Conflicts of Interest

The authors declare no conflict of interest.

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