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Utilizing Artificial Intelligence (AI) for Vocabulary Learning by Saudi EFL Students: Perspectives, Practices, and Challenges

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ABSTRACT

This study aimed to investigate the perceptions and practices of EFL students regarding utilizing AI tools to learn English vocabulary. It also aimed to explore the possible challenges that EFL students face when they use AI for this purpose. The study used a mixed-methods research design: the quantitative data consisted of responses to a questionnaire with closed-ended questions, while the qualitative data comprised responses to open-ended questions. The data were collected from 176 EFL students at a public university in Saudi Arabia. The quantitative data indicated that the EFL learners generally held positive perceptions of AI-assisted vocabulary learning. The participants considered AI an effective and beneficial tool for enhancing their vocabulary compared to traditional methods of vocabulary learning. The study results revealed that translating words and phrases and learning synonyms and antonyms of words are the instances when Saudi learners most often used AI tools. However, the EFL students reported concerns related to technical issues, the lack of cultural and language context and human interaction intrinsic to AI, and ethical considerations concerning the privacy of their personal data, as well as accuracy issues and bias. The study findings displayed that there was a positive correlation between the EFL students' perceptions and practices regarding utilizing AI tools to learn English vocabulary. This study concludes by providing some recommendations on the use of AI tools to support vocabulary learning and suggestions for future studies.

Keywords: Artificial Intelligence (AI); Vocabulary; Students; English as a Foreign Language (EFL)

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1. Introduction

Over the past few decades, EFL classrooms have evolved significantly, moving from traditional instruction to modern approaches that incorporate a wide range of technological tools[1]. Studies have shown that using technology in language learning produces better outcomes compared to conventional methods, which highlights technology's substantial and meaningful influence on knowledge development[2]. Concurrently, the rapid and remarkable growth of digital technologies and the internet has brought about the development of artificial intelligence (AI), which is now influencing various areas of human life. AI has gained widespread attention in the public sphere and has also sparked growing academic attention among educational technologists for its potential applications in pedagogy and student engagement[3,4]. Recently, AI tools have been increasingly used in EFL settings to enhance learners' motivation, increase teaching efficiency, and improve access to educational resources[5,6]. These technologies can provide customized learning experiences and language practice activities that match students' individual needs, proficiency levels, and learning preferences. They also offer immediate, personalized feedback on aspects such as vocabulary, grammar, and pronunciation, which helps make the learning process more engaging and supports improved student performance[7]. These benefits encourage students to take greater responsibility for their language development and become more self-directed in their studies.

EFL learners frequently encounter difficulties when trying to build their vocabulary, largely due to the complex nature of English and the vast number of words it contains[8,9]. Vocabulary acquisition is a gradual process that continues throughout a student's academic journey. As learners progress through different levels of education, they are expected to develop a broad vocabulary base, especially by the time they reach college or university[9]. In this vein, Alshammari[10] pointed out that college and university students in Saudi Arabia often struggle to reach the English proficiency level needed to succeed in their academic pursuits. A key concern is their limited vocabulary development, which tends to fall below the expected standard for their educational level. This issue has created difficulties for various stakeholders in identifying the most effective methods to support Saudi learners of English. Furthermore, even effective teaching approaches may not fully meet individual learning needs or preferences[11].

In response to these challenges, incorporating AI into language education presents a promising opportunity to strengthen EFL learners' vocabulary skills. AI is viewed as a powerful tool that promotes in-depth language learning by generating relevant and meaningful texts based on given prompts. It allows EFL learners to engage in interactive and adaptive dialogues, which makes it a useful resource for expanding vocabulary[12,13]. In their study of AI usage in academic settings, Syahrin and Akmal[14] emphasized the importance of understanding the views of students, instructors, and university administrators to support the successful adoption of AI in scholarly environments. Nonetheless, research examining EFL students' perspectives and practices on the use of AI tools to support vocabulary learning in Saudi Arabia remains limited. Therefore, the current study aims to fill this gap by examining the perceptions of EFL students concerning the use of AI for vocabulary learning in Saudi Arabia. It also explores their practices with these tools as well as the challenges they encounter while using them for vocabulary acquisition.

1.1. Significance of the Study

The current study is valuable to educators, researchers, and policymakers involved in shaping language education strategies that address the needs of EFL students. Its primary goal is to highlight how AI can support vocabulary development within EFL contexts. By examining how learners perceive AI as a supportive tool for improving vocabulary, the research offers important insights into its benefits and potential influence from the users' perspective. The findings of this study may also guide the creation of future educational technologies and instructional approaches that align with the varied learning needs of EFL students. In a rapidly evolving digital landscape, it is essential to explore both the benefits and limitations of emerging educational technologies, such as AI. By addressing the gap in the literature, the current research offers insightful perspectives on incorporating AI into vocabulary learning, thereby contributing meaningfully to ongoing discussions on improving language teaching practices.

1.2. Research Questions

1. What are the perspectives of Saudi EFL students on using AI tools for vocabulary learning?

2. To what extent do Saudi EFL students utilize AI tools for vocabulary learning?

3. What are the challenges that EFL students face when using AI tools for vocabulary learning?

4. Are there correlations between EFL students' perceptions and practices regarding the use of AI tools for vocabulary learning?

2. Literature Review

2.1. Research on AI Technologies

AI represents a form of computational advancement that has increasingly attracted attention due to the swift development of intelligent technologies[15]. A range of AI innovations has been used to enable machines to engage in creative processes. AI involves the development of software capable of analyzing data and carrying out independent tasks, such as performing calculations. Intelligent systems, including online platforms and robots, are designed to operate and respond in ways that resemble human reasoning and decision-making[3]. AI could be described as a kind of computer science focused on the study and design of intelligent systems and applications[16]. It involves training computers to process information and behave in ways that reflect rational thinking. Intelligence serves as the foundation of the AI discipline[16]. AI is described as the examination of intelligent behavior and actions in humans and robots with the goal of identifying methods for enhancing that behavior. Based on specific human-defined objectives, AI systems are capable of making predictions, offering suggestions, or making decisions that impact both virtual and real settings.

The integration and use of technology have long been central topics in both theoretical and practical research within the field of information systems. Various models and frameworks have been widely used for their ability to explain and predict user behavior and attitudes. One of these models is the technology acceptance model (TAM), which was first introduced by Davis[17] and later refined by Venkatesh and Davis[18]. TAM is used to examine user adoption and acceptance of technology, especially in academic contexts[19].

The model emphasizes two main elements that influence a person's use of technology: perceived ease of use (PEOU) and perceived usefulness (PU)[19]. PEOU represents the degree to which users believe that utilizing a certain technology will be simple and uncomplicated. Conversely, PU relates to users' perceptions of how much technology can improve their performance and productivity[17].

2.2. AI in an EFL Context

AI has recently gained widespread attention across various sectors, including education. Within the domain of EFL, AI has been used as a tool to support language teaching and acquisition. It holds promise for offering customized learning experiences, enhancing language assessment, and fostering language proficiency. Multiple investigations have analyzed the role of AI in the EFL domain[6,20]. For instance, Wei[6] demonstrated that AI-mediated instruction resulted in improved English learning outcomes, boosted motivation to learn a second language, and improved self-regulation in learning. Learners in the experimental group who utilized AI tools outperformed the control group across all assessed areas. The use of AI contributed to higher engagement and more individualized learning experiences, which in turn encouraged greater motivation and independent learning. The findings stress the capacity of AI-supported instruction to improve language acquisition and promote learner autonomy. In a similar study, Mohamed[21] investigated the impact of AI tools, such as ChatGPT, in supporting English language acquisition. The outcomes supported the use of AI as a helpful tool to enhance and supplement traditional EFL teaching strategies. However, the study also pointed out potential drawbacks, including the risk that such tools might impede students' critical thinking skills. There were also concerns regarding the reinforcement of bias and misinformation.

Benek[22] reported that most EFL students regularly used AI-powered applications in their English-language learning. These tools were perceived as effective in supporting English proficiency because of their capacity to adapt to learners' specific needs. Thus, AI systems can better respond to individual learning preferences. In addition, Al-Raimi et al.[23] reported that EFL students showed positive perceptions of and attitudes toward AI. However, the study found no correlation between EFL students' perceptions and their practices in using AI tools. Despite these advantages, AI

tools may fall short of addressing the emotional, social, and interpersonal dimensions of language learning, which are considered essential[24]. These observations point to the significance of a well-rounded strategy for AI integration in EFL instruction—one that leverages its benefits while addressing its limitations. In another study, Sumakul et al.[25] described AI as a friend in EFL classrooms that assisted both teachers in delivering instruction and students in learning English. Learner, they emphasized that factors such as student motivation, learner attitudes, and the technological proficiency of teachers should be considered when incorporating AI into the learning environment.

2.3. Using AI for Vocabulary Learning

Vocabulary development is essential to multiple dimensions of language acquisition, including reading, speaking, listening, and writing. AI-powered vocabulary learning holds significant potential to positively transform traditional instructional practices. As noted by Dai and Liu[24], AI is becoming a transformative force in education that offers innovative methods to support vocabulary acquisition. In a study by Hsu et al.[26], the influence of AI image recognition on vocabulary learning was examined. The findings revealed that learners who employed AI tools demonstrated significantly higher vocabulary proficiency levels compared to those who did not. These learners also exhibited increased self-regulation and reduced learning anxiety, indicating that AI is effective for vocabulary learning. Similarly, Hutauruk et al.[27] investigated the impact of AI on enriching English vocabulary acquisition among university students. The results showed that the learners were enthusiastic and motivated and found the use of AI highly enjoyable. The tool proved particularly effective in various writing tasks, including diary entries and essay paragraphs. The researchers recommended incorporating AI chatbots into classroom instruction because they facilitate vocabulary comprehension and offer instant access to word meanings.

Vocabulary learning requires ongoing engagement with rich and meaningful language input. According to interactionist theory, interaction is essential for effective language learning[12]. Complementing this view, input enhancement theory emphasizes the need for accessible and comprehensible input for second-language learning[28]. Valuable input is often characterized by simplification, added redundancy,

and sequenced delivery to enhance understanding[29]. AI tools provide highly interactive, modifiable, and comprehensible input, which aligns with the interactionist theory of language learning. Through interaction with AI, learners receive instantaneous feedback and are encouraged to adjust their linguistic output, which supports effective vocabulary acquisition. Aldowsari and Aljebreen[30] further found that students held a generally positive perception of AI's function in vocabulary learning. The interactive nature of AI applications enables learners to engage more actively and deeply with vocabulary content. These tools allow students to encounter words in a range of authentic contexts and practice their use repeatedly, thereby fostering more robust retention. As learners continue to engage with vocabulary through AI, they gain frequent exposure to different contexts, thereby enhancing both semantic comprehension and long-term acquisition.

AI-powered platforms provide immediate feedback that empowers learners, especially novices, to promptly pinpoint and correct their linguistic mistakes. This immediate feedback is essential for building learner confidence and reducing the likelihood of repeating mistakes. For example, Waziana et al.[31] revealed that the dynamic feedback provided by AI chatbots supported learners in refining and consolidating their vocabulary knowledge. This feedback not only aids in reinforcing correct usage but also helps learners identify specific gaps and weaknesses in their understanding, thus allowing for targeted improvement. In addition, students reported positive perceptions of learning vocabulary through AI chatbots. They described the experience as enjoyable, motivating, and comfortable. The majority of the students thought that the use of AI chatbots significantly contributed to their language development, particularly in terms of vocabulary, by providing valuable and frequent opportunities to broaden their vocabulary. Losi et al.[32] conducted research to examine students' attitudes toward AI tool usage, such as ChatGPT, for learning English vocabulary. The results showed that the students regarded ChatGPT as a helpful, easy-to-use tool that supported input in multiple languages. Most of the students reported being accustomed to using AI to support their English vocabulary learning due to these features. Its accessibility and convenience have contributed to its widespread adoption in vocabulary learning.

According to a study by Jomaa et al.[33], EFL learn-

ers expressed positive attitudes toward utilizing AI tools to learn vocabulary. Participants highlighted several benefits of AI compared to conventional learning approaches, including faster learning, improved retention, and more engaging, enjoyable, and motivating experiences. The research also emphasized the capability of AI to support self-directed vocabulary learning. The learners used AI tools not only to acquire new vocabulary and translate words but also to gain the correct pronunciation of unfamiliar words. Similarly, Mudhsh et al. [34] demonstrated that EFL students had positive perceptions and attitudes toward AI tools for improving their vocabulary and grammar proficiency. Their results showed that there was no significant relationship between EFL students' perceptions of using AI tools and their levels of study, nor was there a relationship between their perceptions and practices in employing AI tools for vocabulary learning.

Although many EFL learners express positive perceptions about using AI for vocabulary acquisition, several challenges remain. According to Shaheen et al. [35], while AI tools enhance the efficiency of learning vocabulary by providing real-time feedback, contextual language translation, and accommodating diverse learning styles, students also reported notable difficulties. One of the most frequently mentioned challenges was technical issues, particularly internet issues. Some learners also raised concerns about reduced human interaction in AI-supported educational contexts. They pointed to the absence of teacher-like feedback and emotional support, such as empathy. Further concerns included the potential misuse of AI, the lack of cultural context in language input, and data privacy risks. While the students expressed a preference for using AI, they stressed the need to resolve these issues. Similarly, Alharbi and Khalil [36] found that students generally held favorable views of AI's function in vocabulary learning. They valued its customized and engaging approach to learning and considered it more effective than conventional instructional methods. Nonetheless, the researchers identified concerns related to technical issues and a notable absence of personal interaction during vocabulary learning using AI. Finally, a study by Taj et al. [37] investigated the barriers EFL students faced during vocabulary acquisition using AI tools. They reported issues related to discrimination, data protection, lack of accessibility, and inadequate technical skills.

According to the literature review, there is a lack of investigation into EFL learners' perspectives and practices regarding the use of AI for vocabulary learning, particularly in Saudi settings. Moreover, given that Syahrin and Akmal [14] emphasized the importance of considering the viewpoints of key stakeholders in a university, such as students, instructors, and administrative staff, when implementing AI in an educational environment, gaining insight into learners' experiences and practices with AI can furnish useful guidance for curriculum developers and educators in designing more effective AI-integration strategies. Therefore, the current study aims to address this research gap by exploring the perceptions and practices of Saudi EFL learners concerning their utilization of and the difficulties they face when using AI for vocabulary learning.

3. Methods

3.1. Instruments

A concurrent embedded mixed-methods research design was employed to investigate Saudi students' perspectives and practices related to using AI tools for learning vocabulary. The primary strand was quantitative and consisted of a questionnaire with closed-ended items measuring students' practices and perceptions. The qualitative approach was embedded within the same data collection instrument through open-ended questions intended to elicit richer details about participants' experiences and challenges regarding AI-supported vocabulary learning. According to Brown [38], open-ended questions allow for the gathering of rich, deep, and detailed information from the participants' "emic perspectives." This design allowed the qualitative data to supplement and enhance the interpretation of the quantitative findings.

Two main instruments were used in this study. The first instrument was designed to assess EFL students' practices and use of AI for vocabulary learning through eight statements rated on a five-point Likert scale from 1 (never) to 5 (always). This instrument was reviewed by three English-language experts to ensure content validity and alignment with the research objectives. The Cronbach's alpha reliability coefficient for this section was 0.95, indicating high internal consistency.

The second instrument consisted of 15 closed-ended items that explored the perceptions of EFL students regard-

ing the use of AI for vocabulary acquisition. Responses were collected using a five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). The closed-ended items were designed to gather information on various facets of students' perceptions of AI tools, such as the perceived effectiveness of AI for vocabulary learning, comfort level and ease of use, perceived benefits and challenges, and the comparative effectiveness of AI versus traditional vocabulary learning methods. This section also includes open-ended questions to further examine the perceived benefits and difficulties of using AI tools in English vocabulary learning. The instrument was adapted from Jomaa et al. [33], who modified it from an earlier study by Alharbi and Khalil [36]. The Cronbach's alpha scale was 0.94 and was found in this study to be 0.97, which reflected strong internal consistency.

3.2. Data Collection and Analysis

The questionnaire was distributed to 205 student participants online via Google Forms. A total of 176 participants responded to the questionnaire, which is a satisfactory sample size for data analysis purposes. The data collected through the closed-ended questions were analyzed using descriptive statistics (means and standard deviations) to summarize the students' perceptions and practices regarding the use of AI tools in vocabulary learning. IBM SPSS Statistics (Version 29) was used for the analysis.

Spearman's correlation coefficients were computed using SPSS to evaluate the correlation between EFL students' perceptions and practices regarding AI tool use for vocabulary acquisition. These two variables were derived from the survey instrument using Likert-scale items. The open-ended responses were analyzed thematically through manual coding and categorization to identify recurring challenges and insights reported by participants. The quantitative and qualitative data were analyzed separately and then integrated during the interpretation of the findings. The qualitative themes enriched the quantitative results by offering deeper explanations of students' perceptions and practices with AI tools.

3.3. Participants

The study population included EFL students from the English-language center at a public university in Saudi Arabia. The students were selected using the random sampling method, and 176 EFL students completed the questionnaire. As seen in **Table 1**, the descriptive statistics showed that 48% were male and 52% were female. Regarding their level of study, 56% of the participants were at level 3, 28% were at level 2, and 16% were at level 1. Most respondents (63%) were within the age range of 18–20 years, whereas 37% were between 21 and 23 years old.

Table 1. The Characteristics of the EFL Student Participants.

Variables		Total Number	Percentage
Gender	Male	85	48%
	Female	91	52%
Age	18–20	110	63%
	21–23	66	37%
Level of study	Level 1	29	16%
	Level 2	49	28%
	Level 3	98	56%

4. Results

4.1. Quantitative Findings: Saudi EFL Students' Perspectives on Utilizing AI Tools for Vocabulary Learning

The first research question explored the viewpoints of Saudi EFL students on using AI tools for vocabulary learning. A high score indicates a positive perspective, while a low score indicates a negative perspective. As seen in **Table 2**, the total mean was 4.04, suggesting that, overall, the EFL students showed a positive stance toward using AI to learn vocabulary. The statements "Using AI for vocabulary learning is effective and beneficial for me" and "I think AI tools enhance my learning of new vocabulary in English" received the highest ratings, with means of 4.20 and 4.12, respectively. Participants confirmed that AI is useful and

enhances vocabulary learning. Some also agreed that they felt comfortable using AI tools to learn vocabulary (mean = 4.05). In contrast, the lowest rating (mean = 3.90) was associated with the statement "I trust the vocabulary words or phrases recommended by AI tools." This suggests that the students were somewhat skeptical about the accuracy of AI-generated content and did not fully trust the feedback given by the AI tools.

Table 2. Means and Standard Deviations of EFL Students' Perceptions of Using AI to Learn Vocabulary.

Item	Mean	St. Deviation
1. Using AI for vocabulary learning is effective and beneficial for me.	4.20	0.909
2. I believe the advantages of using AI for vocabulary learning over the traditional method are faster learning, more personalized learning, better retention, and fun and engaging methods, among others.	4.03	0.889
3. Especially compared to traditional vocabulary-learning methods, I consider AI-based vocabulary learning more effective.	4.02	0.924
4. Using AI tools for vocabulary learning is interesting.	4.03	0.894
5. I completely trust the vocabulary words or phrases recommended by AI tools.	3.90	0.983
6. Using AI tools helps to increase my English vocabulary.	4.04	0.884
7. I use AI tools because I am motivated to learn new vocabulary in English.	4.04	0.909
8. I think AI tools offer me more options to learn vocabulary in English.	4.02	0.933
9. I think AI tools enhance my learning of new vocabulary in English.	4.12	0.905
10. I easily understand the exercises of the new vocabulary presented by AI tools.	4.01	0.902
11. I have not encountered any challenges or difficulties when using AI for vocabulary learning.	4.01	0.882
12. I am completely comfortable with using AI tools for vocabulary learning.	4.05	0.908
13. I find it simple to use the AI tools for vocabulary learning.	4.04	0.906
14. AI tools help to save time and speed up my learning of new vocabulary.	4.02	0.932
15. I will continue using AI tools in the future to learn new vocabulary in English.	4.05	0.883
Total	4.044	0.9089

4.2. Uses of AI Tools for Vocabulary Learning

Table 3 shows the EFL students' uses of AI tools, with a mean of 4.36. It also exhibits the mean of the uses of participants; the highest means were associated with "I use AI vocabulary tools to translate words and phrases" and "I use AI vocabulary tools to learn synonyms and antonyms of words" with means of 4.44 and 4.43, respectively. The participants also stated that they used AI vocabulary tools to learn new words and check the spelling of words, with means of 4.37 and 4.35, respectively.

4.3. Correlational Findings

Spearman's correlation test, as illustrated in **Table 4**, indicated a significant correlation between Saudi EFL students' perceptions and their practices regarding the use of AI for vocabulary learning. The correlation between the participants' perceptions and practices was a strong positive (r = 213).

Table 3. Means and Standard Deviations of Saudi EFL Students' Use of AI Tools for Vocabulary Learning.

Item	Mean	St. Deviation
I use AI vocabulary tools to learn new words	4.37	1.034
I use AI vocabulary tools to translate the meaning of a word	4.31	1.067
I use AI vocabulary tools for translating both words and phrases	4.40	1.025
I use AI vocabulary tools for checking spelling	4.35	1.086
I use AI vocabulary tools to correct the pronunciation of new words	4.32	1.122
I use AI vocabulary tools to correct the use of the vocabulary	4.31	1.076
I use AI vocabulary tools to learn the part of speech of a new word	4.34	1.124
I use AI vocabulary tools to learn synonyms and antonyms of words	4.44	1.028
Total of using AI	4.36	1.00361

Table 4. Correlation between Perceptions and Practices.

Item			Practices
Spearman's rho	Perceptions	Correlation Coefficient	0.213**
		Sig. (2-tailed)	0.001
		N	**176**

4.4. Qualitative Findings: The EFL Learners' Perspectives on Using AI Tools for Vocabulary Learning

As shown in **Table 5**, many students reported positive experiences using AI tools in vocabulary learning. Notably, 25% reported real-time feedback as a major benefit. This is particularly important for the effective development of English vocabulary.

For instance, one participant stated, "AI tools assist me in promptly correcting my pronunciation errors. It is similar to having a teacher who responds immediately." Another student wrote, "I like AI when I do not need to wait for feedback and instant confirmation about whether a response is wrong or right." This immediate feedback enables learners to identify their mistakes at the moment they occur, which helps them correct and internalize accurate vocabulary usage more efficiently. In addition, 22% of participants emphasized the role of AI in providing personalized and adaptive learning experiences. According to a respondent, "AI tools provide English vocabulary exercises, quizzes, and content that align with my current skills and proficiency level." Some students recognized that AI tools for vocabulary learning can tailor exercises to individual needs and support various learning styles. One respondent said, "AI recommends vocabulary lists based on my learning preferences." This approach allows students to focus on the areas that they most need to improve, which ultimately leads to more effective and efficient language acquisition.

Table 5. Thematic Analysis of the EFL Learners' Perspectives.

Themes	Frequency	Percentage
Enhancing their engagement and motivation	26	14%
Personalized Learning	39	22%
Real-time feedback and immersive learning experience	43	25%
Interactive learning	40	23%
Convenience and Flexibility	28	16%

Approximately 23% of respondents revealed that AI tools support interactive learning in vocabulary acquisition. These tools promote active involvement by providing opportunities for learners to interact with new vocabulary repeatedly and within a variety of contexts. Virtual language tutors can engage in conversations, simulating real-life language interactions. These experiences help sustain students' motivation during their vocabulary learning journey. Respondents stated, "I can easily interact with a virtual tutor in a conversational manner" and "It is able to understand my questions and respond with appropriate and relevant information." Similarly, approximately 14% of participants said that AI tools enhance motivation and learner engagement through immersive learning environments, such as gamified platforms and virtual tutors. For instance, one participant reported, "I found studying vocabulary with AI to be more enjoyable than traditional learning, as it encouraged me to actively participate in vocabulary games."

Finally, approximately 16% of respondents described AI tools as convenient and flexible for learning English vocabulary. The incorporation of AI into online learning platforms and mobile applications has made vocabulary practice more accessible, allowing learners to study whenever and wherever it suits them. Student comments included "I can access AI tool vocabulary resources at any time and from anywhere" and "AI tools ensure comfortable and constant access to English vocabulary learning resources." They stressed the benefit of having consistent and easy access to English vocabulary resources without being limited by physical classroom settings or rigid schedules. This convenience enables learners to incorporate vocabulary practice into their daily routines and busy lives, thereby making language learning more manageable and efficient. The availability of varied and context-rich materials further enriches the learning experience by providing students with broader exposure to language use and a deeper understanding of vocabulary.

4.5. Challenges in Using AI Tools for Learning English Vocabulary

As shown in **Table 6**, one of the most frequently reported challenges was technical issues, which were cited by 26% of the participants.

One student noted, "Sometimes malfunctions occurred

due to unstable internet access," while another said, "Outdated devices and inconsistent Wi-Fi posed a substantial obstacle to effective AI usage." Because AI tools typically rely on specialized infrastructure, students in under-resourced environments may face significant disadvantages in accessing these technologies, thereby leading to unequal learning opportunities. Another challenge cited by 24% of the students was the lack of human interaction. In traditional educational settings, interaction with teachers plays a crucial role not only in delivering knowledge but also in offering emotional support and mentorship. According to a participant, "While AI systems might be practical and time-efficient, they fall short in terms of providing the empathy, attentiveness, and personal connection characteristic of real educators." This lack of human interaction can potentially hinder students' social and emotional development and thus their academic progress. For example, one student stated, "Although AI tools provide us with personalized learning experiences, they also promote isolation by reducing opportunities for social interaction."

Table 6. Thematic Analysis of Challenges.

Themes	Frequency	Percentage
Technical issues	46	26%
No human interaction and guidance in their learning process.	42	24%
Lack of cultural and language context	36	20%
Ethical consideration: Concern about the privacy of personal data	30	17%
Accuracy issues and bias	22	13%

Approximately 20% of the participants expressed concerns about AI tools lacking the ability to fully capture cultural and language contexts in vocabulary learning. Some EFL students felt that AI found it difficult to grasp nuanced cultural and contextual aspects of language, such as idiomatic phrases, colloquial expressions, and regional accents. This can result in misunderstandings or incorrect interpretations. For example, one respondent noted that "AI-generated responses sometimes do not reflect the cultural values and perspectives relevant to our background." Furthermore, around 17% of respondents raised ethical concerns about data privacy and security when using AI for vocabulary learning. They were concerned about how their personal information, including vocabulary proficiency data and learning patterns, was collected, stored, and analyzed by these systems. For instance, one participant voiced concerns about how student interactions with AI are managed and used, fearing that personal data might be mishandled. Given the large amounts of data required for AI to function effectively, some students feared that inadequate safeguards could lead to unauthorized access to or abuse of private information. As one participant put it, "I am concerned about the potential future consequences of sharing private data with AI platforms." Finally, approximately 13% of students reported that AI tools sometimes provide inaccurate corrections or recommendations and can be biased. While AI offers immediate feedback, errors can occur. For example, a student reported that "AI tools sometimes have difficulty dealing with varied accents and dialects, which leads to incorrect feedback." These limitations often arise from biases embedded in the training data, which can favor particular language styles or contexts, thereby affecting the accuracy of AI-supported vocabulary learning.

5. Discussion

The current study employed a mixed-methods design to investigate EFL students' perceptions of utilizing AI tools for vocabulary learning at a public university in Saudi Arabia. The study also examined their usage of these tools and the challenges they encountered in acquiring vocabulary. According to Syahrin and Akmal[14], gaining a comprehensive understanding of the standpoints of key stakeholders, such as educators and students, is essential for effectively guiding the adoption of AI technologies within academic environments. The quantitative findings revealed that Saudi EFL participants generally held favorable perceptions of AI-supported vocabulary learning. The students considered AI to be an effective and beneficial tool and emphasized that such tools enhance and support vocabulary development more than traditional methods. Furthermore, the students reported feeling completely comfortable using AI tools for vocabulary prac-

tice. These findings are consistent with those of Losi et al. [32], who also reported positive attitudes toward AI-powered vocabulary learning among EFL learners and noted that these tools improved students' vocabulary.

Drawing from the above results, it is evident that EFL students in Saudi Arabia use AI tools to support and improve their vocabulary development. The students in this study used AI to translate words and phrases as well as to study synonyms and antonyms. In addition, they used AI vocabulary tools to learn new words and check spelling. This may be because, for non-native English speakers, such as Saudi students, understanding the meanings of unfamiliar English words is fundamental for comprehending texts and constructing accurate, meaningful sentences and utterances. Vocabulary serves as the foundation for reading comprehension, writing fluency, and oral communication. Consequently, when students encounter unfamiliar terms, especially in academic settings, they depend heavily on AI tools to provide quick vocabulary meanings, examples, and usage explanations. This dependency on AI for vocabulary learning reflects the important role these tools play in reducing learners' cognitive load and increasing learning efficiency. This outcome aligns with previous findings that participants predominantly used AI tools to learn and translate new word meanings and learn how to pronounce unfamiliar terms [33]. Such evidence may encourage educators to reconsider current vocabulary teaching methods to better achieve language learning objectives. Furthermore, this study demonstrated a positive correlation between students' perceptions and practices regarding the use of AI for vocabulary learning. This suggests that students who held more favorable views of AI tools were more likely to use them in their vocabulary learning. According to the TAM, perception is considered a predictor of the actual use of technology [18]. Thus, the students' perceptions and use of AI are related. This relationship emphasizes the importance of encouraging positive perceptions through training and awareness, as these can directly influence EFL learners' engagement with AI tools and may lead to increased usage and improved vocabulary learning outcomes. These results align with previous studies that found a correlation between students' practices and their perceptions of AI-supported vocabulary learning [34]. Furthermore, the perceptions and usage of AI tools were found to predict each other. Nevertheless, part of the present study did not align with previous findings, as it revealed no significant correlation between students' perceptions and their practices regarding the use of AI for vocabulary learning [23].

The current study's complementary findings emphasize the positive aspects and potential benefits of using AI tools to learn English vocabulary. The qualitative data demonstrated that Saudi EFL students had positive experiences when using AI tools to learn English vocabulary. One of the key benefits identified was the immediate feedback provided. Participants noted that the prompt responses suggested by AI tools played a paramount role in enhancing their language proficiency in real time. This immediate feedback enabled learners to identify and address weaknesses in their vocabulary learning in a personalized manner, which helped them rapidly acquire vocabulary. These findings are consistent with those of Waziana et al. [31], who reported that learners viewed the feedback provided by AI tools as dynamic and instrumental in refining and reinforcing vocabulary learning.

Other positive aspects of using AI tools to support vocabulary learning include increased learner engagement, motivation, and interactivity. Some Saudi EFL students in this study reported that AI-based tools made the learning process more enjoyable and stimulating through features such as interactive exercises, vocabulary quizzes, and engaging challenges. These tools allow learners to engage in conversational practice, receive personalized guidance, and simulate real-life language interactions, thereby boosting their motivation. This may be attributed to the interactive features of the AI platform, which enable learners to encounter words in diverse contexts through various modes and contextual applications. These results align with those of previous studies; for example, Hutauruk et al. [27] found that AI positively influenced university students' vocabulary development, with participants expressing enthusiasm and increased motivation. Likewise, Aldowsari and Aljebreen [30] found that AI tools promoted engagement with targeted vocabulary and allowed for repeated practice, which improved vocabulary retention. This interactive approach to vocabulary learning is consistent with Long's [28] interactionist theory of second-language learning, which stresses the importance of feedback and interaction in language learning.

The results also indicate that AI tools are perceived as both convenient and personalized for vocabulary learning. Learners reported that these tools supported adaptive learn-

ing by tailoring content to their current proficiency levels and specific learning needs. By targeting the areas in which students need improvement, AI accelerates vocabulary acquisition, prevents cognitive overload, and helps learners reach their goals more effectively than traditional methods do. In addition, the flexibility of AI tools allows access to vocabulary learning anytime and anywhere. Learners can bypass time and location limitations, such as those in physical classrooms, and incorporate vocabulary practice into everyday activities, such as during short breaks. This integration supports continuous learning and enriches the overall language acquisition experience. These results are consistent with previous studies conducted by Hsu et al. [26] and Alharbi and Khalil [36]. Those studies also highlighted students' positive perceptions of AI tools and the benefits of being personalized, accessible, and efficient in the context of vocabulary learning.

While there are positive perceptions and distinct benefits of using AI, EFL students may face challenges when using AI for vocabulary acquisition. Identifying and addressing these difficulties will help to effectively integrate AI into vocabulary learning. For example, students in this study reported issues related to technical problems and privacy concerns. AI tools typically rely on constant access to the internet and suitable hardware, which may not be available in all educational settings. Inadequate access to this type of infrastructure creates inequities that prevent some students from using AI tools. In addition, inadequate data protection policies can compromise users' privacy and expose their personal and academic information to the public. Taj et al. [37] corroborated these findings and noted that the students in their study faced limitations, such as a lack of access, minimal technological capabilities, and ethical issues regarding data protection. Therefore, it is important to provide equal access to technology and the assistance and training required to use it. Because some students come to university without prior exposure to or knowledge of AI tools for vocabulary learning, there is a pressing need to provide them with the necessary support to learn how to use these tools.

In addition, Saudi EFL students in this study reported facing challenges related to accuracy issues, a lack of human interaction, and AI's limited understanding of contextual nuances. Some students expressed concerns that AI tools do not always provide accurate answers and may sometimes display

bias in their recommendations. Variations in accents and dialects can result in incorrect feedback and misunderstandings when using AI tools. Typically, these tools are trained on standardized language data, which may not fully capture informal expressions and regional speech patterns. As a result, AI's tendency to offer suggestions based on formal English norms may be unsuitable for specific language contexts, such as informal or academic settings [39]. This may explain why some university students feel that AI tends to recommend overly formal styles when more flexible or appropriate language is required. Such mismatches can reduce the tool's effectiveness and lead to frustration or decreased confidence in AI-assisted learning. Therefore, when integrating AI tools into educational settings, it is important to consider contextual appropriateness and linguistic diversity. In addition, while AI can efficiently support vocabulary learning, it cannot replace the emotional support, mentorship, and human interaction that educators provide. Understanding and addressing the challenges that may prevent EFL students from using AI is essential to realizing its potential in vocabulary learning. These findings align with previous studies [24,35,36], which also identified challenges involved in EFL students using AI for vocabulary learning.

6. Conclusions

This study examined the perceptions of Saudi EFL learners regarding the use of AI tools for vocabulary learning, their AI tool usage practices, and the challenges they face. Although Sumakul et al. [25] argued that AI can be considered a friend that supports effective language acquisition, students' perceptions and attitudes must be considered when integrating AI into university EFL classrooms. This study's findings showed that Saudi EFL students generally had positive perceptions of using AI tools for vocabulary acquisition. The analysis revealed that the most common uses of AI tools among Saudi EFL students were translating words and phrases, learning synonyms and antonyms, acquiring new vocabulary, and checking spelling. In addition, a correlation was identified between the students' perceptions and their use of AI tools, which suggests that positive perceptions can affect EFL students' use of AI tools. Understanding these perceptions and addressing the challenges that students face can enable educators and policymakers to develop in-

formed strategies and guidelines for implementing AI tools, thereby enriching vocabulary learning experiences in higher education.

This study provides an overview of the challenges and benefits of using AI for vocabulary learning from the perspective of Saudi EFL students. AI has demonstrated several benefits for improving vocabulary, including personalized learning experiences, immediate feedback, convenience, and flexibility, as well as enhanced interaction and motivation. Despite these benefits, challenges remain. Students reported technical issues, limited human interaction, a lack of cultural and linguistic context, concerns about personal data privacy, and problems related to accuracy and bias. Based on the data from this study, integrating AI into language and vocabulary learning requires an ethical framework, and policy- and decision-makers must take preventive action. Many students enter university without prior exposure to or knowledge of AI learning tools, which highlights the urgent need to provide them with proper training and awareness. Successful integration of AI into EFL vocabulary learning requires equitable access to technology and the necessary training and assistance.

In Saudi Arabia, the Ministry of Education primarily oversees the higher education system, and most universities are public institutions. Consequently, selecting participants from a public university reflects the national educational structure and offers insight into the experiences of most Saudi EFL students at the university level. However, this approach may limit the generalizability of the findings to private institutions, of which there are comparatively few. Future research should include students from a variety of institutional contexts, such as private universities and schools, to gain a comprehensive understanding of EFL students' perceptions and practices with AI tools for vocabulary learning across the Saudi education system. Future research could also explore EFL learners' perceptions of using AI for vocabulary learning while controlling for variables that could affect their perceptions, such as level of study, gender, and AI anxiety level. Further studies could investigate how AI can improve other English language skills, particularly listening and reading skills. Finally, as this study was limited to one public university in Saudi Arabia, future research should include a broader sample of students from different universities and schools.

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Conflicts of Interest

The author declares no conflict of interest.

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