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Utilising Artificial Intelligence (AI) in Vocabulary Learning by EFL Omani Students: The Effect of Age, Gender, and Level of Study

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ABSTRACT

AI tools have enabled FLLs to navigate their journeys of learning languages. This poses several questions, particularly about the most common AI tools used in learning vocabulary and the attitudes of EFL Omani students toward using AI tools in learning English. A mixed-method research design was utilised, and the sampling included 236 respondents studying in the Sultanate of Oman. An SPSS version 29 was employed in analysing the quantitative data, whereas the qualitative data were analysed thematically. The qualitative data revealed that EFL Omani students depended heavily on Google Translation (44%) as the highest AI tool, followed by the Dictionary Application (32%), ChatGPT (22%), Chat Bot (17.40%), and Duolingo (15.70%). In addition, translating the meaning of a new word occupied the highest learning strategy (frequency: 141), followed by learning new vocabulary (frequency: 134), translating the meaning of a full sentence (frequency: 91), and learning the correct pronunciation of strange words (frequency: 90), whereas learning grammar, enhancing writing and reading skills had the lowest frequency. The quantitative data showed that the overall mean is (3.67), which reveals a high frequency of use of AI tools in learning vocabulary. The lowest mean (3.45) is associated with trusting the new vocabulary recommended by AI tools, whereas the positive effectiveness of AI tools has the highest mean (3.92). However, it was found that age, gender, and level of study do not affect EFL Omani students' use of AI tools to learn vocabulary.

Keywords: AI Tools; L2 Vocabulary; ELT; FL; Omani Students

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1. Introduction

Progresses in artificial intelligence tools have created unlimited opportunities in which communication restrictions can be overcome[1, 2]. In other words, recent improvements in technology have influenced numerous areas, namely English Language Teaching (ELT) because of the fundamental role played by technology[3–5]. Based on studies conducted, language acquisition and learning based on technology outperform conventional methods, thus revealing a considerable and reasonable effect on the process of language learning[6]. However, learning foreign languages represents a challenge for foreign learners since these learners have insufficient vocabulary[7]. Therefore, mobile technologies characterised by elements such as communication applications and language applications have attracted the curiosity of several scholars[8]. For example, Lafleur[9] demonstrated that applications with gamified daily awards, compared with conventional teaching, are associated with higher beneficial learning outcomes.

At present, the practice of integrating AI (Artificial Intelligence) with the process of learning languages online presents an outstanding opportunity for achieving professional English education[10]. That is, studies on incorporating AI tools in learning the English language offer motivating learning opportunities[11], while concurrently presenting potential obstacles. Further, as Amin[12] points out, integrating AI into EFL education leads to both thrilling expectations and considerable limitations. However, only a few studies have examined learners' attitudes toward employing AI tools to learn English in general and vocabulary in particular in the Omani context; therefore, in their study, Syahrin and Akmal[13] suggest "understanding the perspectives of key stakeholders, namely students, instructors, and administrative staff within a university setting… becomes essential for guiding AI's integration in Oman's academic realm" (P. 86). With the intense focus on examining the effectiveness of new trends in technology, namely Memrise on vocabulary learning, Aprizal and Wachyudi[14] also revealed a need for more studies to explore other learning contexts and address technical aspects. Such findings could contribute to an understanding of how FL learners, particularly Omani students learn vocabulary in a second language setting. Consequently, this study examines the perspectives of EFL Omani students on the use of AI tools in learning English vocabulary and identifies both the most common applications in their learning journey as well as the general learning strategies for employing AI tools. Independent variables like age, gender, and levels of study were examined to identify their possible influence on using AI tools to learn new vocabulary in English.

2. Literature Review

Advanced technologies have made the language teaching and learning process much more attractive, interesting, engaging, and varied. Based on multiple studies conducted on technology and education, adopting current technologies could lead to students' learning motivation and interactive characteristics in the classroom[15–18]. Several studies have found that mobile learning has facilitated learning foreign languages compared with the traditional method[19, 20]. Besides, Wang, Teng, and Chen[21] revealed that students' engagement with learning English increases by employing technological applications. It was noticed that learning vocabulary utilising these applications is characterised by high confidence among the majority of the students. However, variables like students' age, affective filter, and language threshold need to be considered while integrating technology into the process of language instruction[22].

In acquiring or learning any language, obtaining sufficient vocabulary plays a fundamental role in mastering a language that is particularly significant for university students, since the depth of academic vocabulary knowledge learned by students has a rationally active indication of academic success as it could subsequently enhance understanding of more specialised academic texts and lectures[23]. Moreover, Elder and Von Randow[24] state "The size of a student's lexicon functions as an effective predictor of academic success" (p. 177). In other studies, vocabulary size is considered to be the best indicator of overall academic achievement[25–27].

As a result of highly advanced technology, particularly AI tools, learning foreign languages has become conceptually easier. In their study of using AI tools in learning languages, it was found that ChatGPT has a positive impact on writing skills, thereby encouraging students, especially in online classes, and interactive language learning experiences, but it has limited effects on speaking, grammar, and word skills. Additionally, ChatGPT was found to expand students' concepts of varied cultures and enhance their creative as well

as thinking skills in their activities in the classroom [28]. In another study, Rusmiyanto, Huriati, Fitriani, Tyas, Rofi'i, and Sari [2] showed that AI tools carry the potential to significantly enhance the communication skills of English. These findings emphasise the pedagogical implications, including personalized learning experiences and learner autonomy. In the context of Saudi Arabia, it was revealed that using Chatbot, as a new technology, could positively enhance ESP vocabulary of ESP learners. In other words, the results of the pre-test and post-test showed that students in the experimental group significantly outperformed students in the control group in terms of learning ESP words [29].

In his study on ChatGPT in teaching English, Al-Khresheh [30] illustrated that pedagogically, incorporating ChatGPT can present students with real-time adaptive feedback, thereby allowing for instant modifications and explanations. In another study, Alharbi and Khalil [31] demonstrated that 80.6 % of the respondents represented by students have a positive attitude toward utilising AI tools effectively in learning English vocabulary. Similarly, Sumakul et al. [32] revealed that the students had a positive stance toward incorporating AI tools in the classroom. Oktadela, Elida, and Ismail [7] added that the Chatbot application resulted in greater happiness and enthusiasm among the students in their English language development. This experience has led to increase their English vocabulary through conversing with the Chatbot application. Consequently, employing these AI tools can be for varied purposes, for instance, Alsadoon [33] enumerated that for vocabulary learning, translation occupied the highest ranking, followed by the dictionary. Compared with another study conducted by [34], it was found that YouTube was the most common alternative adopted by foreign learners to learn vocabulary, followed by Quizzis, Duolingo, and Kahoot. This result shows clearly that students learn vocabulary more when it is associated with fun, entertainment, and something they select to watch rather than to complete something imposed on them. Aprizal and Wachyudi [14] also showed that Memrise has the potential to positively influence vocabulary learning, with themes, such as mobile app preferences, technical considerations, autonomy, motivation, and gamification.

In their study, Leong, Pataranutaporn, Danry, Perteneder, Mao, and Maes [35], showed that generative AI-driven context personalisation could positively influence learning motivation. However, limited exposure to AI-generated personalized learning examples has no immediate development in learning performance. Further, Crum, Li, and Kou [36] highlighted the significance of aligning AI-enhanced learning products with learners' pedagogical needs. This can be achieved through training English teachers to ensure meaningful integration of AI in teaching English in the classroom. The effectiveness of AI tools in enhancing ESP vocabulary was also revealed by [37]. Therefore, they recommended ESP teachers employing chatbot applications and other digital and remote technologies to teach ESP vocabulary and strengthen students' engagement in their learning process.

To attain effective teaching and learning of the English language, training courses should be provided to the participants regularly [36, 37]. Based on their encouraging findings and the positive stance of the respondents, Wang, Teng, and Chen [21] recommended adopting various technological applications to teach English in general and vocabulary in particular in the classroom to meet foreign language learners' needs. Furthermore, Yu and Trainin [22] suggested examining the effect of technology-assisted incidental L2 vocabulary learning by employing qualitative studies. Finally, Lu [20] suggested incorporating mobile phone use with interaction functions. These suggestions can be made possible with the recent advancement of technology, particularly AI applications to learn foreign languages. However, in the Omani context, limited studies have investigated the perspectives of Omani students toward the use of AI tools to learn English vocabulary; consequently, the purpose of the current study is to address the following research questions.

(1) What are the most common AI tools employed by Omani students to learn English?
(2) Why do Omani students use AI tools in the linguistic context?
(3) What are the attitudes of Omani students toward using AI tools in learning vocabulary?
(4) Does using AI tools to learn English vocabulary vary across age, gender, and levels of study?

Three independent variables (age, gender, and levels of study) were examined in the current study to determine their possible effect on using AI tools to learn English vocabulary.

3. Materials and Methods

A mixed-method research design was followed in the current study to present a comprehensive description of the topic under examination. The quantitative research design was established to examine the perspectives of Omani students toward using AI tools in vocabulary learning. The closed-ended questions were accompanied by open-ended questions to explore the most common AI tools used by Omani students in learning English in general and vocabulary in particular. To ensure ethical standards, the respondents were given clear instructions on the goals of the study before responding to the questionnaire. All collected data were securely stored and devoid of personal identification markers by assuring the respondents that their responses would be used strictly for research and academic purposes.

The questionnaire was sent online via Google Forms and was distributed randomly to 500 Omani students studying at the Preparatory Studies Center. 236 Omani students responded to the questionnaire and their responses were considered valid. The questionnaire included four parts: the first part involved questions related to independent variables, such as gender, age, and levels of study. Concerning age, it was divided into two groups: group 1: 17–18–19, and group 2: 20–21–22. Regarding the level of study, students need to finish four preliminary levels of English at the Preparatory Studies Center before they are allowed to embark on the specialty courses of their own individual pathways of study; each of the preliminary English levels extends for one semester. However, some students may join level 3 or level 4 directly based on their English placement test results. The second part included closed-ended questions (20 question items) with a five-point Likert scale ranging from 1. Strongly disagree to 5. Strongly agree.

The first eight question items (from 1 to 8) with closed-ended questions were adopted from a previous study conducted by Alharbi and Khalil[31], whereas 12 question items (from 9 to 20) were developed by the researchers in the current study and added to the questionnaire to make it more comprehensive. These question items tackle varied aspects of learning vocabulary: Q1: AI effectiveness in vocabulary learning, Q2: Comfort in using AI tools, Q3: Advantages of AI, Q4: Challenges in using AI tools, Q5: Effectiveness of AI compared with the traditional method, Q6: Trusting vocabulary presented by AI, Q7: AI frequency of use, Q8:

Recommending AI to peers, Q9: Recommending AI because of ease of use, Q10: Interesting AI tools, Q11: Understanding AI-aided exercises, Q12: Spending much time using AI tools, Q13: Using AI tools in the future, Q14: Motivation in using AI tools, Q15: Using AI tools to increase vocabulary, Q16: Using AI tools to increase knowledge in English, Q17: AI tools offer more options to learn vocabulary, Q18: AI enhances learning vocabulary, Q19: AI provides wrong answers, and Q20: AI tools solve learning new vocabulary. These question items were developed and added to the adopted questionnaire after consulting experts in the field and getting their feedback. In addition, a pilot study on 50 students was conducted to make sure of the reliability of the study using an SPSS version 29. The Cronbach's Alpha revealed a correlation of 0.936 which is higher than good. **Table 1** illustrates the reliability statistics of the pilot study.

Additionally, open-ended questions were developed based on the researchers' observations of students' activities in the classroom and were added to the online Google Forms to enrich the data and provide a great deal of supplementary information that is considered significant to learning English vocabulary. A thematic analysis was followed to analyse the qualitative data, which were quantified to make comparisons between the most common AI tools and identify their language learning strategies.

Utilising an SPSS version 29, the reliability statistics of the main sampling including 236 Omani students based on Cronbach's Alpha showed a correlation of 0.942 which is higher than good. **Table 2** shows the reliability statistics of the main study.

Descriptive statistics, such as means, std. deviations, frequencies, as well as highest and lowest means were reported based on the analysis utilising an SPSS version 29. An independent sample t-test was used to analyse the possible effect of age (two categories) and gender (two categories) individually on using AI tools to learn English vocabulary by Omani students, whereas one-way ANOVA was used to analyse the probable effect of the level of study (four levels) on using AI tools to learn English vocabulary.

The survey was distributed randomly and sent online via Google Form to 500 EFL Omani students studying the General Foundation Program at the Preparatory Studies Center at one of the public universities in the Sultanate of Oman. 236 students responded to the questionnaire and their ques-

Table 1. Reliability statistics of the pilot study.

Reliability Statistics (50 Omani Students)		
Cronbach's Alpha	Cronbach's Alpha based on standardized items	No. of items
0.936	0.937	20

Table 2. Reliability statistics of the main study.

Reliability Statistics (236 Respondents)		
Cronbach's Alpha	Cronbach's Alpha based on standardized items	No. of items
0.942	0.943	20

tionnaires were adjudged to be valid for the analysis. The respondents were of varied ages, genders, and levels of study. **Table 3** illustrates the demographic overview of the respondents.

Table 3. Demographic background of the respondents.

Variables		No.	%
Gender	Male	139	58.1
	Female	97	41.9
Age	Group 1: 17–18–19	172	729
	Group 2: 20–21–22	64	27.1
Level of study	Level 1	49	20.8
	Level 2	87	36.9
	Level 3	52	22
	Level 4	48	20.3

The number of male students is more than the number of female students: 139 male students and 97 female students. The respondents' age ranged from 17 to 22; therefore, they were categorised into two groups: group 1 involved 17 to 19 with 172 students, whereas group 2 involved 20 to 22 with 64 students. As for their level of study, students from the four levels of study responded to the questionnaire. Level one included 49 respondents, level two involved 87 respondents, level three had 52 respondents, whereas level four included 48 respondents. All the respondents are Omani students who learn English as a foreign language.

4. Results

This section has three subsections. Section one describes the most common AI tools to learn English vocabulary. Section two explores the learning purposes employed by Omani students while utilising AI tools. Section three examines the perspectives of Omani students toward the use of AI tools in learning English vocabulary.

4.1. Most Common AI Tools to Learn Vocabulary

Figure 1 shows the most common AI tools employed by Omani students to learn English vocabulary.
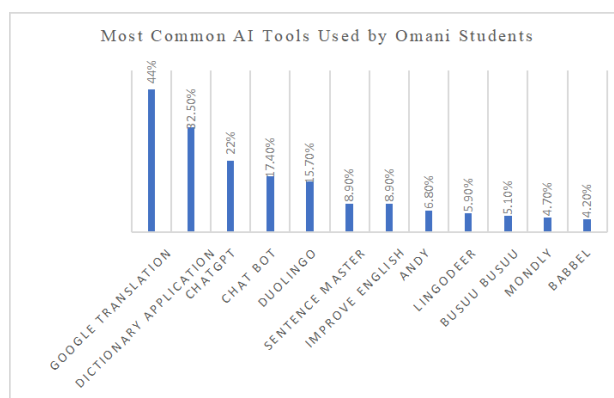
Figure 1. Most common AI tools used by Omani students.

On one hand, Google Translation, Dictionary Application, ChatGPT, Chat Bot, and Duolingo attracted the highest degree of interest and use among Omani students, whereas Sentence Master, Improve English, Andy, Lingodeer, Busuu Busuu, Mondly, and Babbel had a lower rate. The top-used tools are explained as follows:

(1) Google Translation

Google Translation represents the highest level of application of AI tools used by Omani students to learn English vocabulary. This result can be associated with the purposes of using AI tools, whereby the majority of Omani students use them to translate the meaning of new words. This may be due to the inability of students to comprehend the meaning of a text or a sentence unless it is translated.

(2) Dictionary Application

Dictionary Applications installed on students' mo-

bile phones occupied the second highest ranking following Google Translation. It seems that both Google Translation and Dictionary applications serve the same purpose; therefore, they are commonly used by Omani students. Students use them overwhelmingly to translate from English into Arabic and vice versa to obtain further comprehension of the reading texts and assist them in writing.

(3) ChatGPT

This application is also commonly used by Omani students, particularly to help them with their writing tasks and assignments. It is also used to provide students with examples of some specific grammatical rules.

(4) Duolingo

Duolingo is ranked fifth among the most common AI tools to learn English in general and vocabulary in particular. The special feature of this application is its comprehensive scope, whereby all language skills, namely listening, speaking, reading, writing, and language areas, such as grammar, vocabulary, and pronunciation are included. Learners need to pass each lesson and unit to move to the following step.

4.2. Common Learning Strategies Using AI Tools

Table 4 shows the learning strategies utilised by Omani students while using AI tools to learn English.

Translating the meaning of new words occupied the highest ranking among other learning strategies used by Omani students. This can be noticed in the classroom while doing their activities, especially fill-in-the-blank activities and writing new sentences using the new words.

Learning new vocabulary had the second ranking among other learning strategies. No doubt that learning a foreign language starts with vocabulary; therefore, Omani students select such a strategy to increase the size of their vocabulary.

To translate the meaning of a full sentence was ranked third. It is associated with strategy No. 1, but the difference here is translating a full sentence. This learning strategy may be followed by Omani students to save time spent compared

with translating the meaning of individual words. To photoshoot a full text and translate it is another strategy ranked fifth that is related to translating a text from English into Arabic or from Arabic into English. This implies that a third of the learning strategies in utilising AI tools is linked with translation. Learning other language areas, such as pronunciation also motivated Omani students to use AI tools to learn the correct pronunciation of strange words.

4.3. Attitudes of Omani Students Toward Employing AI Tools to Learn English Vocabulary

In general, Omani students revealed a positive stance toward employing AI tools to learn English vocabulary. **Table 5** reports the mean, std. deviations, and frequency of use of the 20 question items.

The lowest mean as clarified in **Table 6** is associated with question item Q6 since some AI tools may provide wrong information; therefore, learners cannot completely trust the feedback given. This implies that self-learning is sometimes challenged unless accompanied by the feedback offered by the English instructors. This question item is correlated with question item Q19, "I think some answers of AI tools include wrong information", which had a high mean. In contrast, all other question items had a high mean, thereby implying a positive stance by Omani students toward using AI tools to learn English vocabulary.

Table 6 reveals the mean and standard deviation of the 20 questions items that compose the full questionnaire. The overall mean showed high use. Notably, the responses to all individual question items were high excluding one question item Q6, "I completely trust the vocabulary words or phrases recommended by AI tools", which was reported with medium use (3.4576). This means that language learners know that AI tools to learn new vocabulary have not succeeded in gaining learners' complete trust. In contrast, question item Q1, "Using AI for vocabulary learning is effective and beneficial for me" had the highest mean (3.9237). **Table 7** below shows the effect of age on using AI tools to learn English vocabulary by EFL Omani students.

Table 4. Common learning strategies using AI tools.

Rank No.	Strategies	Frequency
1	To translate the meaning of a word.	141
2	To learn new vocabulary.	134
3	To translate the meaning of a full sentence.	91
4	To learn the correct pronunciation of strange words.	90
5	To photo shoot a full text and translate it.	84
6	To enhance my speaking skills	79
7	To enhance my listening skills	74
8	To improve my English in general	71
9	To learn language grammar	67
10	To enhance my writing skills	65
11	To enhance my reading skills	58
12	Other benefits	50

Table 5. Mean, std. deviation, and frequency of use.

No.	Question Items	Mean	Std. Deviation	F.
Q1	Using AI for vocabulary learning is effective and beneficial for me.	3.9237	0.95121	High
Q2	I am completely comfortable with using AI-based tools or apps for vocabulary learning.	3.7712	0.97554	High
Q3	I believe the advantages of using AI for vocabulary learning over the traditional method are: faster learning, more personalized learning, better retention, fun and engaging methods, etc.	3.6864	0.91511	High
Q4	I have not encountered any challenges or difficulties when using AI for vocabulary learning.	3.5339	1.02880	High
Q5	Especially compared to traditional vocabulary learning methods, I consider AI-based vocabulary learning more effective.	3.5339	1.05735	High
Q6	I completely trust the vocabulary words or phrases recommended by AI tools.	3.4576	0.99054	Medium
Q7	I often use AI tools or applications for vocabulary learning.	3.6568	0.97457	High
Q8	I would recommend AI-based vocabulary learning tools to my peers.	3.6229	1.02196	High
Q9	I would recommend AI-based vocabulary learning tools to my peers because of their ease of use.	3.7203	0.99689	High
Q10	Using AI tools for vocabulary learning is interesting.	3.8136	0.89869	High
Q11	I easily understand the exercises of new vocabulary presented by AI tools.	3.5890	0.91123	High
Q12	I want to spend much time and effort using AI tools to learn new vocabulary in English.	3.5085	1.00844	High
Q13	I will use AI tools frequently in the future to learn new vocabulary in English.	3.7203	0.93067	High
Q14	I use AI tools because I am interested and motivated to learn new vocabulary in English.	3.5805	0.98385	High
Q15	I use AI tools to increase my vocabulary in English.	3.8644	0.90779	High
Q16	I use AI tools to increase my knowledge of English and its culture.	3.8390	0.96289	High
Q17	I think AI tools offer me more options to learn vocabulary in English.	3.8051	0.88734	High
Q18	I think AI tools enhance my learning of new vocabulary in English.	3.7839	0.93622	High
Q19	I think some answers of AI tools include wrong information.	3.5339	0.99087	High
Q20	I think AI tools will solve the problem of learning new vocabulary in English.	3.7034	0.90680	High

Table 6. Highest and lowest means of the 20 question items.

No.	Question Items	Mean	Std. Deviation	No
Q6	I completely trust the vocabulary words or phrases recommended by AI tools.	3.4576	0.99054	236
Q12	I want to spend much time and effort using AI tools to learn new vocabulary in English.	3.5085	1.00844	236
Q19	I think some answers of AI tools include wrong information.	3.5339	0.99087	236
Q4	I have not encountered any challenges or difficulties when using AI for vocabulary learning.	3.5339	1.02880	236
Q5	Especially compared to traditional vocabulary learning methods, I consider AI-based vocabulary learning more effective.	3.5339	1.05735	236
Q14	I use AI tools because I am interested and motivated to learn new vocabulary in English.	3.5805	0.98385	236
Q11	I easily understand the exercises of new vocabulary presented by AI tools.	3.5890	0.91123	236
Q8	I would recommend AI-based vocabulary learning tools to my peers.	3.6229	1.02196	236
Q7	I often use AI tools or applications for vocabulary learning.	3.6568	0.97457	236
Q3	I believe the advantages of using AI for vocabulary learning over the traditional method are: faster learning, more personalized learning, better retention, fun and engaging methods, etc.	3.6864	0.91511	236
Q20	I think AI tools will solve the problem of learning new vocabulary in English.	3.7034	0.90680	236
Q9	I would recommend AI-based vocabulary learning tools to my peers because of their ease of use.	3.7203	0.99689	236
Q13	I will use AI tools frequently in the future to learn new vocabulary in English.	3.7203	0.93067	236
Q2	I am completely comfortable with using AI-based tools or apps for vocabulary learning.	3.7712	0.97554	236
Q18	I think AI tools enhance my learning of new vocabulary in English.	3.7839	0.93622	236
Q17	I think AI tools offer me more options to learn vocabulary in English.	3.8051	0.88734	236
Q10	Using AI tools for vocabulary learning is interesting.	3.8136	0.89869	236
Q16	I use AI tools to increase my knowledge of English and its culture.	3.8390	0.96289	236
Q15	I use AI tools to increase my vocabulary in English.	3.8644	0.90779	236
Q1	Using AI for vocabulary learning is effective and beneficial for me.	3.9237	0.95121	236

Table 7. The effect of age on using AI tools to learn English vocabulary.

	Age	N	Mean	Std. Deviation	Std. Error Mean	Frequency of Use
Q1	17–19	172	3.9070	0.98084	0.07479	High
	20–22	64	3.9688	0.87230	0.10904	High
Q2	17–19	172	3.7674	0.97542	0.07438	High
	20–22	64	3.7813	0.98349	0.12294	High
Q3	17–19	172	3.6395	0.92291	0.07037	High
	20–22	64	3.8125	0.88864	0.11108	High
Q4	17–19	172	3.5581	1.04970	0.08004	High
	20–22	64	3.4688	0.97539	0.12192	Medium
Q5	17–19	172	3.4709	1.06198	0.08098	Medium
	20–22	64	3.7031	1.03402	0.12925	High
Q6	17–19	172	3.4419	0.96251	0.07339	Medium
	20–22	64	3.5000	1.06904	0.13363	High

Table 7. *Cont.*

	Age	N	Mean	Std. Deviation	Std. Error Mean	Frequency of Use
Q7	17–19	172	3.6628	0.95649	0.07293	High
	20–22	64	3.6406	1.02921	0.12865	High
Q8	17–19	172	3.6047	0.98858	0.07538	High
	20–22	64	3.6719	1.11348	0.13918	High
Q9	17–19	172	3.6802	0.97756	0.07454	High
	20–22	64	3.8281	1.04737	0.13092	High
Q10	17–19	172	3.7907	0.93804	0.07152	High
	20–22	64	3.8750	0.78680	0.09835	High
Q11	17–19	172	3.5581	0.86659	0.06608	High
	20–22	64	3.6719	1.02438	0.12805	High
Q12	17–19	172	3.4535	1.00475	0.07661	Medium
	20–22	64	3.6563	1.01134	0.12642	High
Q13	17–19	172	3.7267	0.93081	0.07097	High
	20–22	64	3.7031	0.93740	0.11718	High
Q14	17–19	172	3.5116	1.00576	0.07669	High
	20–22	64	3.7656	0.90400	0.11300	High
Q15	17–19	172	3.8198	0.92215	0.07031	High
	20–22	64	3.9844	0.86359	0.10795	High
Q16	17–19	172	3.8547	0.93461	0.07126	High
	20–22	64	3.7969	1.04167	0.13021	High
Q17	17–19	172	3.8198	0.90293	0.06885	High
	20–22	64	3.7656	0.84969	0.10621	High
Q18	17–19	172	3.7849	0.92730	0.07071	High
	20–22	64	3.7813	0.96722	0.12090	High
Q19	17–19	172	3.5349	0.94526	0.07208	High
	20–22	64	3.5313	1.11225	0.13903	High
Q20	17–19	172	3.6860	0.89523	0.06826	High
	20–22	64	3.7500	0.94281	0.11785	High
Overall	17–19	172	3.6637	0.64857	0.04945	High
	20–22	64	3.7328	0.70796	0.08850	High

Table 7 shows no significant differences among Omani students in terms of employing AI tools to learn English vocabulary. This means that age does not have any effect on Omani students' attitudes and inclinations to use AI tools. In the Omani context, using smartphones starts at an early stage, whereby children and teens use them as devices to play games or watch videos. This implies that all students can be considered as the digital generation who can use mobile devices smartly and have access to the internet. Therefore, age might have an influence when considering students with varied generations (age 20 and age 50 for instance). The overall mean of both age groups, namely group one (17 to 19) and group two (20 to 22), was 3.6637 and 3.7328, respectively, thus revealing high use for both groups. There were only differences in the mean of four question items (Q4, Q5, Q6, and Q12) ranging from medium to high frequency of use. In general, the majority of students are well aware of the internet skills and the varied AI tools used pedagogically in their foreign language learning journey; therefore, no significant differences were found between the two categories of age as an independent variable. However, comparing learners with larger differences in age categories may result in significant differences. **Table 8** reveals the effect of gender on using AI tools to learn vocabulary in English by EFL Omani students.

Table 8. The effect of gender on using AI tools to learn English vocabulary.

	Gender	N	Mean	Std. Deviation	Std. Error Mean	
Q1	Male	139	3.8777	0.95143	0.08070	High
	Female	97	3.9897	0.95192	0.09665	High
Q2	Male	139	3.7770	0.98572	0.08361	High
	Female	97	3.7629	0.96580	0.09806	High
Q3	Male	139	3.7050	0.93602	0.07939	High
	Female	97	3.6598	0.88843	0.09021	High
Q4	Male	139	3.5899	1.06194	0.09007	High
	Female	97	3.4536	0.97916	0.09942	Medium
Q5	Male	139	3.6043	1.08760	0.09225	High
	Female	97	3.4330	1.00941	0.10249	Medium
Q6	Male	139	3.5468	0.98704	0.08372	High
	Female	97	3.3299	0.98659	0.10017	Medium
Q7	Male	139	3.6259	1.02345	0.08681	High
	Female	97	3.7010	0.90329	0.09172	High
Q8	Male	139	3.6835	1.01465	0.08606	High
	Female	97	3.5361	1.03140	0.10472	High
Q9	Male	139	3.7770	1.02181	0.08667	High
	Female	97	3.6392	0.95944	0.09742	High
Q10	Male	139	3.7698	0.92718	0.07864	High
	Female	97	3.8763	0.85705	0.08702	High
Q11	Male	139	3.6259	0.98741	0.08375	High
	Female	97	3.5361	0.79138	0.08035	High
Q12	Male	139	3.6187	0.98095	0.08320	High
	Female	97	3.3505	1.03119	0.10470	Medium
Q13	Male	139	3.7338	0.98962	0.08394	High
	Female	97	3.7010	0.84366	0.08566	High
Q14	Male	139	3.5468	0.97225	0.08246	High
	Female	97	3.6289	1.00332	0.10187	High
Q15	Male	139	3.8345	0.96757	0.08207	High
	Female	97	3.9072	0.81755	0.08301	High
Q16	Male	139	3.8345	1.02573	0.08700	High
	Female	97	3.8454	0.87011	0.08835	High
Q17	Male	139	3.7410	0.94285	0.07997	High
	Female	97	3.8969	0.79693	0.08092	High
Q18	Male	139	3.7698	0.97294	0.08252	High
	Female	97	3.8041	0.88552	0.08991	High
Q19	Male	139	3.4964	1.03821	0.08806	Medium
	Female	97	3.5876	0.92142	0.09356	High
Q20	Male	139	3.7410	0.92735	0.07866	High
	Female	97	3.6495	0.87846	0.08919	High
Overall	Male	139	3.6950	0.70205	0.05955	High
	Female	97	3.6644	0.60947	0.06188	High

Table 8 shows no significant differences between male and female students in terms of using AI tools to learn English vocabulary. All question items had a high frequency of use, excluding five question items. A slight difference was noticed only in question items 4, 5, 6, 12, and 19. This result might be attributed to the similarity between male and female students in terms of having access to the internet and their awareness of the AI tools used in learning languages. Almost all students have smartphones and can navigate the websites for any useful tools that can help them in learning English in general and vocabulary in particular. Surprisingly, a similarity exists between the possible effect of age and gender on using AI tools to learn English vocabulary concerning four question items (Q4, Q5, Q6, Q12).

Table 9 shows the results of the possible effect of the level of study on using AI tools to learn English vocabulary. A one-way ANOVA was performed to report any differences among the four levels of study and their probable influence on using AI tools to learn English vocabulary. The findings reported no statistically significant use of the 20 question

items. In other words, there is no statistical difference between the levels of study (Level 1, Level 2, Level 3, and Level 4) and using AI tools to learn English vocabulary. This result could be attributed to the possible effect of following the same teaching method by English instructors, whereby all teachers need to teach the students the same learning materials, fulfill the same learning objectives, and abide by the instructions of the test specifications.

Table 9. The effect of level of study on using AI tools to learn English vocabulary.

OneWay ANOVA		Sum of Squares	df	Mean Square	F	Sig.
Q1	Between groups	4.903	3	1.634	1.825	0.143
	Within groups	207.725	232	0.895		
	Total	212.627	235			
Q2	Between groups	1.888	3	0.629	0.658	0.578
	Within groups	221.756	232	0.956		
	Total	223.644	235			
Q3	Between groups	0.062	3	0.021	0.024	0.995
	Within groups	196.735	232	0.848		
	Total	196.797	235			
Q4	Between groups	3.271	3	1.090	1.030	0.380
	Within groups	245.458	232	1.058		
	Total	248.729	235			
Q5	Between groups	4.908	3	1.636	1.472	0.223
	Within groups	257.821	232	1.111		
	Total	262.729	235			
Q6	Between groups	1.461	3	0.487	0.493	0.687
	Within groups	229.116	232	0.988		
	Total	230.576	235			
Q7	Between groups	1.001	3	0.334	0.348	0.790
	Within groups	222.198	232	0.958		
	Total	223.199	235			
Q8	Between groups	3.722	3	1.241	1.191	0.314
	Within groups	241.715	232	1.042		
	Total	245.436	235			
Q9	Between groups	3.927	3	1.309	1.323	0.268
	Within groups	229.615	232	0.990		
	Total	233.542	235			
Q10	Between groups	0.708	3	0.236	0.289	0.833
	Within groups	189.089	232	0.815		
	Total	189.797	235			
Q11	Between groups	2.481	3	0.827	0.996	0.396
	Within groups	192.651	232	0.830		
	Total	195.131	235			
Q12	Between groups	1.861	3	0.620	0.607	0.611
	Within groups	237.122	232	1.022		
	Total	238.983	235			
Q13	Between groups	2.361	3	0.787	0.908	0.438
	Within groups	201.181	232	0.867		
	Total	203.542	235			

Table 9. *Cont.*

OneWay ANOVA

		Sum of Squares	df	Mean Square	F	Sig.
Q14	Between groups	3.652	3	1.217	1.262	0.288
	Within groups	223.818	232	0.965		
	Total	227.470	235			
Q15	Between groups	3.127	3	1.042	1.269	0.286
	Within groups	190.534	232	0.821		
	Total	193.661	235			
Q16	Between groups	4.554	3	1.518	1.651	0.178
	Within groups	213.328	232	0.920		
	Total	217.881	235			
Q17	Between groups	1.914	3	0.638	0.808	0.490
	Within groups	183.120	232	0.789		
	Total	185.034	235			
Q18	Between groups	2.252	3	0.751	0.855	0.465
	Within groups	203.727	232	0.878		
	Total	205.979	235			
Q19	Between groups	6.656	3	2.219	2.297	0.078
	Within groups	224.073	232	0.966		
	Total	230.729	235			
Q20	Between groups	2.428	3	0.809	0.984	0.401
	Within groups	190.809	232	0.822		
	Total	193.237	235			

5. Discussion

This mixed method study aimed to examine the attitude of Omani students toward using AI tools in learning English in general and vocabulary in particular. The questionnaire with both open-ended questions representing the qualitative approach and closed-ended questions representing the quantitative part was distributed to 500 students. 236 questionnaires were responded to by Omani students studying the foundation program (2 years) before joining their main study at one of the public universities in the Sultanate of Oman.

The qualitative findings revealed that Google Translation and Dictionary applications were the most common AI tools used mainly by FL Omani students to translate the meanings of a new word or a full sentence or learn new vocabulary. For non-native speakers like Omani students, obtaining meanings of new words in English is basic to comprehend the text and ensure that their message is delivered well. Therefore, they depend heavily on Google Translation and Dictionary Applications to get the meanings of new words. This finding partially agrees with the results of other studies. For instance, Hendrawaty, Yuliati, and Haryanti[34] found that EFL students favored learning vocabulary through media, including songs, games, English films with subtitles, books, technology-supported games, online/offline dictionaries, books, academic journals, YouTube, and Quizziz. This may draw the attention of teachers, textbook publishers, and compilers to reconsider recent methods of teaching vocabulary to achieve goals related to vocabulary and language learning. Further, Alsadoon[33] stated that translation occupied the highest rank followed by the dictionary applications to learn vocabulary. Likewise, Ma and Chiu[38] revealed that the majority of the participants stated that dictionary applications on mobile devices helped them in their vocabulary learning. They used these applications to find the meanings of new words or to check their comprehension of the text. This finding is in line with the findings in the current study, whereby the students used AI tools to translate the meanings of new words in English.

The quantitative findings revealed that age, gender, and levels of study have no remarkable effect on the use of AI tools to learn English vocabulary. Notably, both gender and age have approximately the same influence on the frequency of use of a few question items. This similarity between male

and female students in learning languages was proved in previous studies[39], thereby supporting Hyde's[40] gender similarities hypothesis (GSH). Leong, Pataranutaporn, Danry, Perteneder, Mao, and Maes[35] demonstrated in their study how learning motivation might be positively impacted by generative AI-driven context customisation. Further, Crum, Li, and Kou[36] emphasised how important it is to match learners' pedagogical demands with AI-enhanced learning solutions. This can be accomplished by providing English teachers with the necessary training to guarantee the effective integration of AI into English language instruction. Additionally, Silitonga, Wiyaka, and Prastikawati[37] demonstrated the efficacy of AI techniques in improving ESP vocabulary.

Consequently, it can be argued that advanced technologies have made the language teaching and learning process much more attractive, interesting, engaging, and varied[16, 17]. For instance, mobile learning has facilitated learning foreign languages compared with the traditional method[20]. Moreover, students like learning English better, and their engagement with learning English increases by employing applications on iPads, which is characterized by high confidence among the majority of the students[21]. AI tools such as ChatGPT have a positive impact on writing skills and provide real-time, adaptive feedback[28–30]. These findings strongly suggest that AI tools support equitable learning opportunities across various ages, genders, and study levels[28–30]. However, variables like students' age, affective filter, and language threshold need to be considered while integrating technology into the process of language instruction[22].

In their study, Karataş, Abedi, Gunyel, Karadeniz, and Kuzgun[28] added that merging AI tools in foreign language learning should be used wisely due to the possible over-reliance on ChatGPT by students. This concern concurs with the previous studies emphasising that the over-dependence of students on AI tools could possibly result in skill deterioration and impede the improvement of critical thinking skills and learners' autonomy. Such findings necessitate a balanced approach to integrating AI technologies into language learning curricula. In other words, the significance of teachers' roles should not be neglected in this domain since they can ensure that AI tools are used cautiously and that such tools are used to complement rather than replace the role of instructors.

However, technology-based education is changing over time. For example, earlier, computer-assisted L2 vocabulary was considered to be more effective compared with traditional learning. A few years ago, mobile-assisted L2 vocabulary learning was considered more effective compared with computer-assisted L2 vocabulary learning[22]. Moreover, there is a difference between incidental instructions which resulted in more benefits to learners, and intentional ones in terms of technology-assisted L2 vocabulary as Yu and Trainin[22] stated. This may imply a difference between what is mandatory and what is optional, as well as the possible influences of individual feedback and group feedback. The first category, namely incidental instructions, could be more effective since a student may feel that s/he is given further interest and care, whereas group feedback may be categorised as intentional instructions.

Further, autonomous learning using AI tools raises significant concerns about the extent of monitoring students by their teachers or even parents, thereby requiring attention from all parties, as this aspect touches upon the fundamental issues of privacy and the appropriate role of surveillance in educational settings. Though using AI tools implies immense potential for transforming English vocabulary learning, lack of training and motivation, as well as complexities inherent in AI tool adoption may diminish the practicability of achieving the aspirational goals of education and language learning. This perspective is in line with Liu and Chen[41], Alharbi and Khalil[31], and Sumakul et al.[32], whereby collective efforts can lead to considerable improvements in educational technology.

One of the significant findings reported in this study is the potential of self-learning of English vocabulary that can be enhanced by using AI tools, particularly since the majority of students have access to the internet on their mobile phones[20]. However, self-learning utilising AI tools needs to be examined thoroughly to measure the extent to which students remain engaged and motivated to continue studying outside the classroom because the majority of the language applications based on AI tools are not integrated with the curricula that teachers teach. In this regard, Al-Khresheh[30] emphasised the need for "professional development and agile curriculum adaptation to maximize the potential of ChatGPT and other AI tools" (p. 1). Yu and Trainin[22] added that designers of technology should focus on creating var-

ied meaningful contexts, whereby vocabulary is embedded in sentences and stories that could be presented in varied inputs. In other words, textbooks designed for teaching English should adapt to the new revolution in the teaching and learning process brought about mainly by AI tools. Thus, activities in these textbooks should be varied allowing both teachers and students to explore this new trend in teaching and learning languages.

6. Conclusions

Employing a mixed research design could present thoughtful insights into the attitudes and perspectives of EFL Omani students toward utilising AI tools to learn English in general and vocabulary in particular. Pedagogically, although AI-based vocabulary learning tools are engaging and motivating, a need arises for thorough research to evaluate their pedagogical efficacy compared to traditional methods. In other words, experimental studies can be conducted on students and learners in different contexts with varied L1 and L2 backgrounds to explore the perspectives of more participants and examine aspects for a long-term period, including vocabulary retention, communication skills, reading comprehension, and writing skills. Effective feedback is also crucial for vocabulary learning; nonetheless, the quality and timing of feedback offered by AI systems need further research to compare the feedback given by language instructors and the automatic feedback provided by AI tools. Further, studies should focus on how AI-driven vocabulary learning tools could be integrated into language curricula and instructional practices. This may include exercises related to the reading materials and other language skills and areas that need to be considered to provide language learners with a comprehensive journey that mimics reality. Other studies can also explore the effect of AI tools on improving academic writing skills at the postgraduate level.

Author Contributions

Conceptualization, N.J. and R.A.; methodology, N.J. and R.A.; software, N.J.; validation, N.J., R.A. and M.A.; formal analysis, N.J.; investigation, M.A.; resources, M.A.; data curation, M.A.; writing—original draft preparation, N.J.; writing—review and editing, R.A.; visualization, M.A.; supervision, N.J.; project administration, N.J.; funding acquisition, N.J., R.A., and M.A. All authors have read and agreed to the published version of the manuscript.

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Data Availability Statement

All data, results, and research instruments used in the study are available upon request.

Conflict of interest

The authors declare no conflict of interest.

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