

Bridging Technology and Vocabulary Development: Iranian EFL Learners' Insights and the Comparative Effects of Adobe Connect and WhatsApp

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DOI: [10.71864/LCT-2025-1218586](https://doi.org/10.71864/LCT-2025-1218586)

Received:
20/06/2025

Revised:
15/09/2025

Accepted:
26/09/2025

Published:
29/09/2025

Keywords:

Adobe
Connect; EFL
vocabulary
acquisition;
social media;
WhatsApp

Abstract: This study explored Iranian English as a Foreign Language (EFL) learners' attitudes toward using social media applications for vocabulary learning and compared the effects of Adobe Connect and WhatsApp on vocabulary acquisition. A mixed-methods design was employed, combining a quasi-experimental quantitative phase with a qualitative follow-up via semi-structured interviews. Thirty upper-intermediate EFL learners (Mage = 19.5) from a top language school in Tehran were randomly assigned to two experimental groups based on their Oxford Online English Level Test scores. The first group received instruction via Adobe Connect, while the second group used WhatsApp. Both groups were taught 96 coronavirus-related vocabulary items over eight sessions. Quantitative analyses involved independent-samples t-tests to compare pretest scores between groups, paired-samples t-tests to examine within-group improvements, and an independent-samples t-test on posttest scores to determine differential effects of the treatments. Qualitative data from interviews were analyzed using NVivo software to identify themes regarding learners' attitudes and experiences. Results indicated no significant differences between groups at pretest, but the Adobe Connect group showed significantly greater improvement than the WhatsApp group at posttest. Interview findings revealed that learners preferred the interactive, classroom-like environment of Adobe Connect despite higher cognitive effort, while WhatsApp was valued for convenience but criticized for potential distractions. These findings suggest that synchronous, feature-rich online platforms may be particularly effective for supporting vocabulary development in EFL settings.

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Cite this article: Azizpour, Sh., & Pourcheragh, M. (2025). Bridging Technology and Vocabulary Development: Iranian EFL Learners' Insights and the Comparative Effects of Adobe Connect and WhatsApp. *Journal of Language, Culture, and Translation*, 8(1), 233–254. <https://doi.org/10.71864/lct-2025-1218586>

1. Introduction

Advances in digital communication and emerging technologies have profoundly reshaped education, offering innovative tools that challenge and transform traditional pedagogical practices. Over the past decade, online platforms, virtual learning environments, and social media applications have become central to language teaching and learner engagement. These technologies not only expand opportunities for the dissemination of knowledge but also challenge traditional pedagogical frameworks, particularly in relation to vocabulary instruction. By facilitating greater accessibility and interactivity, digital tools reshape the dynamics of language learning, prompting teachers to reconsider traditional methodologies and adapt to evolving modes of communication and instruction.

The Coronavirus pandemic accelerated this transformation by compelling institutions worldwide, including those in Iran, to transition rapidly from face-to-face instruction to remote learning (Azizpour, 2021). In this context, reliance on digital platforms became both a necessity and an opportunity to reimagine language instruction. Traditional vocabulary teaching methods, often reliant on rote memorization and repetitive drills, have long been criticized for failing to cultivate deep learning or communicative competence. In contrast, digital tools introduce interactivity, multimedia integration, and collaborative features that can significantly enhance learners' ability to acquire and apply new vocabulary in authentic contexts (Alasal, 2025; Azizpour, 2021).

Digital communication technologies have become critical to education and professional collaboration, with platforms such as Adobe Connect and WhatsApp offering distinct yet complementary affordances. Adobe Connect, developed by Adobe, is a web-conferencing and virtual learning environment designed to support synchronous interaction through customizable meeting rooms equipped with interactive features, including video and audio streaming, screen sharing, whiteboards, polls, breakout sessions, and file exchange. Its persistent room structure allows teachers to create stable, reusable environments that enhance consistency in teaching, while also enabling session recording and flexible role management (Adobe, 2024). However, WhatsApp, a messaging application owned by Meta, was originally designed for everyday interpersonal communication but has gradually found a place in educational contexts. Beyond text messaging, it offers voice and video calls, media sharing, and group communication, which make it effective as an informal and low-cost way to keep learners connected beyond the classroom. Moreover, WhatsApp could foster cooperative learning and

academic engagement when integrated into formal learning settings (Lee et al., 2023; Slakmon, 2024).

A growing body of research has investigated digital approaches to language learning. Mobile-assisted language learning (MALL), for instance, capitalizes on the accessibility of smartphones and tablets, allowing language learners to access linguistic resources anytime and anywhere (Dehghan et al., 2017; Golonka et al., 2014; Gorjian et al., 2011; Hajebi et al., 2018; Namaziandost & Nasri, 2019; Pachler et al., 2012; Ravenscroft et al., 2012; Yong, 2012). Similarly, computer-assisted language learning (CALL) has evolved from basic drill-based software into sophisticated, interactive environments that replicate classroom experiences through video conferencing, interactive whiteboards, and breakout sessions (Otto, 2017; Schmid, 2009). In addition, social media platforms such as WhatsApp are increasingly used for language practice, forming virtual communities that merge formal instruction with everyday communication (Al Arif, 2019; Sujata et al., 2019).

Although each of these technologies has been shown to support language development, most prior studies have examined them independently. This leaves a critical gap regarding their comparative effectiveness, particularly in vocabulary acquisition. While existing research suggests that both synchronous platforms (e.g., Adobe Connect) and asynchronous platforms (e.g., WhatsApp) can facilitate language learning, few studies have examined their relative impact within the same instructional setting. This gap is particularly salient in Iran, where traditional pedagogical practices have long predominated and where the sudden adoption of remote modalities has created an urgent need to identify which digital tools most effectively support vocabulary development. By comparing Adobe Connect, a synchronous, multimedia-rich platform, with WhatsApp, an asynchronous and flexible tool, the present study aims to address this underexplored area.

A variety of theories and models have been proposed for online instruction by different educational theorists. The current study subscribes to Garrison et al.'s Community of Inquiry (CoI) model (1999) as its theoretical framework. This model confers the greatest importance to three distinct presences: cognitive, social, and teaching. Additionally, it supports the design of online and blended courses as active learning environments or communities dependent on teachers and learners sharing ideas and information. It is worth noting that presence is a social phenomenon expressed through interactions among professors and their students. Moreover, the COI model is one of the most popular models of online instruction and learning for online courses that are designed to be

highly interactive among learners and their teacher using blogs, discussion boards, chat boxes, and audio or video conferencing.

The significance of this study is multifaceted. As educational institutions worldwide continue to invest heavily in digital technologies, it is essential to determine whether such investments translate into measurable learning improvements. Identifying the platform features most conducive to vocabulary acquisition will not only enhance teaching practices but also guide curriculum development and policy-making. Employing a mixed-methods approach, integrating quantitative measures of vocabulary acquisition with qualitative insights into learners' experiences, this study provides a comprehensive perspective that encompasses both cognitive and affective dimensions of learning. Accordingly, it offers new insights into how digital platforms influence language development and establishes a framework for future research. The findings are expected to yield practical implications for the design and implementation of digital instruction, contributing to more effective language learning outcomes.

Another key contribution of this study is its focus on a diverse sample of Iranian EFL learners, including both male and female participants. This inclusive approach addresses a gap in the literature concerning gender and learner diversity in digital language learning environments, thereby increasing the generalizability of the findings. In a rapidly globalizing educational landscape, research that incorporates diverse learner perspectives is crucial to developing effective digital learning strategies.

The primary objective of this study is to compare vocabulary learning outcomes between Iranian EFL learners using Adobe Connect and those using WhatsApp. A secondary objective is to explore learners' attitudes toward using these platforms to determine which features most effectively support learning. Finally, the study seeks to identify the cognitive and affective factors underlying any observed differences in instructional effectiveness. Thus, these objectives offer a multidimensional understanding of how digital platforms can be optimized for vocabulary instruction.

Finally, it is important to emphasize the broader relevance of the present research questions in light of ongoing educational challenges. The global transition to remote learning has highlighted the need for rigorous, evidence-based evaluations of digital platforms. As institutions refine their strategies for integrating technology into instruction, findings from this comparative study will prove vital in ensuring that digital tools not only support but also enhance language learning. By addressing this need, the current study makes a practical contribution, offering

recommendations for the effective integration of digital platforms into vocabulary teaching. The following research questions were formulated to address the objectives of the study:

1. Is there any significant difference in vocabulary acquisition between Iranian EFL learners who receive instruction via Adobe Connect and those who are taught through WhatsApp?
2. How do Iranian EFL learners perceive and evaluate their learning experiences with Adobe Connect compared to WhatsApp, particularly in terms of interactivity, quality of feedback, and overall satisfaction?
3. What cognitive and affective factors contribute to the differences in vocabulary acquisition observed between instruction provided through Adobe Connect and WhatsApp?

2. Method

The current study adopts an explanatory mixed-methods design, integrating both quantitative and qualitative approaches to generate a comprehensive understanding of how digital platforms influence Iranian EFL learners' vocabulary acquisition. The research is structured around a quasi-experimental framework, enriched by qualitative inquiry. By combining these methodological components, the study not only assesses vocabulary development but also provides insight into the cognitive and experiential processes underlying these learning outcomes.

2.1. Participants

Thirty Iranian EFL learners (23 females and 7 males), aged between 17 and 22 years ($M = 19.5$), participated in this study. They were recruited from a leading English language school in Tehran, which is renowned for its innovative teaching practices and high instructional standards, providing an ideal context for investigating digital learning. To determine participants' initial proficiency, all completed the Oxford Online English Level Test and were classified as upper-intermediate learners, ensuring a relatively homogeneous language proficiency level. Demographic data indicated that approximately half of the participants had received two to three years of formal English instruction, while the remaining students had engaged in three to four years of both academic and extracurricular language programs. After the proficiency assessment, participants were randomly assigned to one of two experimental groups. It is worth noting that including both female and male learners allowed the study to capture a diverse range of experiences, thereby enhancing the external validity and generalizability of the findings.

2.2. Instruments

Multiple instruments were employed to collect both quantitative and qualitative data. Each instrument is described in detail below.

2.2.1. Oxford Online English Level Test

Initially, the Oxford Online English Level Test, a standardized 40-item assessment covering vocabulary, grammar, listening, and reading comprehension, was administered to assess participants' initial language proficiency and to classify and select them based on proficiency levels. Its robust reliability and validity make it an essential tool for screening participants and for the subsequent assessment of vocabulary acquisition.

2.2.2. Blended Vocabulary Knowledge Test

Drawing upon content from reputable sources, including Cambridge, English Today, and ESL Flow, the Blended Vocabulary Knowledge Test was developed to assess both receptive and productive vocabulary knowledge. This test was administered as a pre-test and again as a post-test, with alternative items provided to mitigate practice effects, thereby enabling accurate measurement of vocabulary development. The test incorporated a range of item formats, including multiple-choice, matching, and fill-in-the-gap items, providing a comprehensive evaluation of participants' acquisition and retention of the target vocabulary. The test demonstrated satisfactory internal consistency (Cronbach's $\alpha = .86$ for receptive and $.84$ for productive sections), and its content validity was confirmed through expert review by nine specialists in Applied Linguistics and language assessment.

2.2.3. Coronavirus Vocabulary List

A vocabulary list comprising 96 terms related to the Coronavirus was meticulously compiled from four authoritative online sources. Selection criteria emphasized frequency, relevance, and contextual significance within current global discourse. The list formed the central content of the treatment, ensuring that all participants were exposed to the same essential vocabulary items. The topical relevance and real-world applicability of these terms not only enhanced learner engagement but also underscored the practical significance of the study in the context of contemporary information landscapes.

2.2.4. Task Projects

To actively engage learners and reinforce vocabulary acquisition, Task Projects (TPs) were designed to draw on the unique features of each

digital platform. For the Adobe Connect group, TPs included interactive dialogues, picture-based guessing games, and live group discussions that draw upon the platform's synchronous features, such as real-time video conferencing and digital whiteboards. For the WhatsApp group, TPs were adapted to an asynchronous format, comprising voice-recorded monologues and written text activities. These tasks were strategically structured to promote active vocabulary use, enhance retention, and support contextual learning of the target items.

2.2.5. Semi-Structured Interview Protocol

Semi-structured interviews, comprising seven open-ended questions, based on the interview protocol developed by the researchers, were conducted to explore the learners' perceptions, experiences, and overall satisfaction with the digital instructional platforms. The initial items for the interview protocol were developed based on a thorough review of the related literature and the researchers' experience and knowledge of digital teaching platforms. Moreover, the researchers set up one group interview session with two teachers in order to initially try out the interview questions and revise them in light of the given comments and suggestions. Furthermore, in order to validate the interview questions, three assistant professors in Applied Linguistics with specializations in online education commented on them. Interviews were conducted following the treatment, audio-recorded, and subsequently transcribed for thematic analysis using NVivo software. The rich qualitative data obtained through these interviews contributed to a nuanced understanding of the factors influencing observed vocabulary acquisition outcomes. It is worth noting that the semi-structured interviews took 25-35 minutes, and a content analysis was used for the analysis (Marton, 1994). This means that the researchers developed the interview questions and ensured their linguistic and content validity. Further, the content validity was reexamined by a panel of nine language experts.

2.3. Procedure

The study employed a mixed-methods design to examine Iranian EFL learners' vocabulary development and to explore their attitudes, cognitive strategies, and overall satisfaction with two digital instructional platforms. Thirty learners, including both genders, were recruited from an English language school in Tehran. To ensure homogeneity in language proficiency, all participants completed the Oxford Online English Level Test, a standardized 40-item assessment covering grammar, vocabulary, listening, and reading comprehension. Based on the results. Then, the

participants were randomly assigned to one of two experimental groups, with one group receiving instruction via Adobe Connect and the other through WhatsApp.

Prior to the treatment, the Blended Vocabulary Knowledge Test, developed using established sources, was administered to explore initial vocabulary knowledge. This test assessed both receptive and productive vocabulary through multiple-choice, matching, and fill-in-the-blank items. The treatment focused on a compiled set of 96 Coronavirus-related vocabulary items selected from four authoritative sources based on frequency, relevance, and contextual significance. Over eight sessions of approximately 105 minutes each, participants engaged with TPs designed to promote active vocabulary use, retention, and contextual learning. For the Adobe Connect group, synchronous tasks included interactive dialogues, picture-based guessing games, and live group discussions utilizing real-time video conferencing and digital whiteboards, whereas the WhatsApp group completed asynchronous activities such as voice-recorded monologues and written exercises.

Following the post-test, semi-structured interviews were conducted with 15 volunteer participants to support the quantitative findings by providing in-depth insights into the participants' attitudes, experiences, and overall satisfaction with the instructional platforms. All learners were invited to participate in the interviews, and volunteers were selected from both groups and genders to minimize bias. Inter-coder reliability, calculated using Cohen's Kappa, was 0.84, indicating strong agreement. All participants were required to provide informed consent to participate in this study, and their names were not disclosed in the study to maintain anonymity. To further ensure the reliability and credibility of the findings, member checking was employed. This involved validating the accuracy of interpretations by comparing them with participants' own attitudes and statements. It is worth noting that a content analysis was used for the analysis. This means that the researchers developed the interview questions and ensured their linguistic and content validity. Furthermore, the content validity was reexamined by a panel of language experts. Further, trustworthiness is a critical issue in this study. To meet credibility standards, peer review was done, and the members of the qualitative research team checked this study in terms of bias and honesty. Moreover, the researchers checked the answers with participants one more time to ensure the credibility of the results. Besides, a code-recode strategy, which is an intra-rater assessment, was also used to reach dependability. After coding the data, they were put aside for a while and then recoded by the researchers. The interview protocol consisted of seven open-ended

questions developed through a comprehensive review of the literature and the researchers' expertise in digital teaching. A pilot session with two teachers was held to refine the questions, and three assistant professors in Applied Linguistics specializing in online education reviewed the protocol to ensure content validity. All interviews were audio-recorded, transcribed, and thematically analyzed using NVivo software, offering rich qualitative data that illuminated the factors influencing participants' engagement with the digital platforms and their vocabulary learning outcomes.

2.4. Data Analysis

In the quantitative phase, a vocabulary knowledge test was administered as a pretest to assess the learners' initial vocabulary levels. An independent-samples t-test was then conducted to compare the pretest scores of the Adobe Connect and WhatsApp groups. To examine whether the two experimental groups indicated significant improvement in vocabulary knowledge from pretest to posttest, paired-samples t-tests were performed for each group. Afterwards, to determine whether the groups differed in their posttest performance or benefited differently from the treatments, an Independent-samples t-test was conducted to compare the posttest scores of the Adobe Connect and WhatsApp groups. In the qualitative phase, learners' attitudes toward using the two applications, WhatsApp and Adobe Connect, were explored through semi-structured interviews. The interview data were analyzed using NVivo software. Then, themes were explored to provide insights into learners' attitudes and experiences.

3. Results

3.1. Statistical Analysis of Quantitative Data

Table 1 indicates the descriptive statistics. At pretest, the mean scores on the vocabulary test were very similar across the two groups. Specifically, the Adobe Connect group had a mean score of 11.13 (SD = 2.26), and the WhatsApp group had a mean score of 11.07 (SD = 2.43). After learning vocabulary using the different platforms, participants in the Adobe Connect group improved their scores by 5 points (M = 16.73, SD = 1.1), which was higher than the mean score observed for the WhatsApp group (M = 13.87, SD = 2.13).

Table 1. Group Statistics

	Group	N	Mean	Std. Deviation	Std. Error Mean
Pretest	Adobe connect	15	11.13	2.264	.584
	WhatsApp	15	11.07	2.434	.628
Posttest	Adobe connect	15	16.73	1.100	.284
	WhatsApp	15	13.87	2.134	.551

To explore whether the observed differences prior to treatment were statistically significant, an independent-samples t-test was conducted to compare the pretest scores for the Adobe Connect and WhatsApp groups. There was no significant difference between the Adobe Connect group ($M = 11.13$, $SD = 2.26$) and the WhatsApp group ($M = 11.07$, $SD = 2.43$); $t(28) = 0.078$, $p = 0.94$, two-tailed.

Table 2. Independent Samples Test (Pretest)

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Pretest	Equal variance assumed	.009	.924	.078	28	.939	.067	.858	-1.691	1.825
	Equal variance not assumed			.078	27.85	.939	.067	.858	-1.692	1.825

To assess whether both groups developed their vocabulary knowledge significantly from pretest to posttest, paired-sample t-tests were performed (see Table 3). The results demonstrated that participants in the Adobe Connect group exhibited a significant vocabulary gain (Mean difference = 5.6, $SD = 1.88$; $t(14) = -11.52$, $p = 0.000$, two-tailed), and the WhatsApp group also indicated a significant gain (Mean difference = 2.8, $SD = 0.68$; $t(14) = 16.04$, $p < .001$, two-tailed).

Table 3. Paired Samples T-Test Comparing the Groups on Pre- and Post-Test

Group	Mean difference	Std. Deviation	Std. Error Mean	Paired Differences		t	df	Sig. (2-tailed)
				95% Confidence Interval of the Difference				
				Lower	Upper			
Adobe Connect	-5.600	1.882	.486	-6.642	-4.558	-11.523	14	.000
WhatsApp	-2.800	.676	.175	-3.174	-2.426	-16.039	14	.000

Finally, posttest scores were examined to determine whether the groups performed differently or benefited differently from the treatments. An independent-samples t-test comparing the posttest scores for the Adobe Connect and WhatsApp groups revealed a significant difference between the Adobe Connect group ($M = 16.73$, $SD = 1.1$) and the WhatsApp group ($M = 13.87$, $SD = 2.13$); $t(28) = 4.62$, $p < .001$, two-tailed.

Table 4. Independent samples t-test for obtained scores on post-test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Diff.	Std. Error Diff.	95% Confidence Interval of the Difference	
									Lower	Upper
Posttest	Equal variances assumed	3.497	.072	4.62	28	.000	2.86	.620	1.59	4.13
	Equal variances not assumed			4.62	20.94	.000	2.86	.620	1.57	4.15

3.2. Investigation of Qualitative Data

As indicated by the quantitative results, both Adobe Connect and WhatsApp demonstrated positive effects in vocabulary development; however, Adobe Connect was more effective than WhatsApp. The qualitative phase of the study provided further insight into the factors contributing to this finding. This section offers a detailed account of the learners' attitudes toward the use of these two social media platforms in enhancing vocabulary acquisition.

Regarding the positive aspects of social media and mobile devices for language learning, participants put under the spotlight the significance of these tools. They particularly highlighted the portability of mobile devices, which allows them to learn vocabulary anytime and anywhere. Additionally, they noted that social media and mobile platforms provide easy access to a vast range of information and learning materials in real time. This accessibility enabled participants to use these tools not only for expanding their English vocabulary but also for developing other language skills. The following comment from Participant 1 (P1) elucidates this:

“A cell phone helps us improve our English skills by removing time barriers and enabling real interactions beyond the classroom. It lets us practice speaking and listening with other learners. Also, through searching on the internet it provides opportunities to develop reading and writing. Regular exposure to new texts and phrases on the phone speeds vocabulary development and reinforces learning through real-world use.”

Concerning the negative aspects, the majority of participants cited health concerns as a significant drawback of using mobile devices and social media for language learning in general, and for vocabulary learning in particular. Additionally, some participants noted that social media can distract users from learning and may lead to mobile phone addiction as a result of excessive use of the platform for non-language learning purposes:

Regarding the negative aspects, the majority of the participants identified health-related concerns as a notable drawback of using mobile devices and social media for language learning, particularly for vocabulary acquisition. Moreover, several participants pointed out that social media might serve as a source of distraction, potentially drawing learners' attention away from educational activities. Excessive use of these platforms for non-language learning purposes was also noted as a factor that may contribute to cell-phone dependency. This is evident in the following excerpts from Participant 4 (P4) and Participant 13 (P13), respectively:

“Social media often distracts us from learning. Instead of studying, we spend much of our time on Instagram, downloading music, reading jokes, or following fashion channels. This habit can lead to headaches, sleep disorders, and weakened family relationships. Rather than talking with family members, we end up spending our time on various online channels.”

"I believe that relying on social media for vocabulary learning can be disadvantageous, as the language used is often informal and limited."

Further, the qualitative findings demonstrated that most participants generally perceived the instructional environment within Adobe Connect as more positive and pedagogically effective. They described it as resembling a traditional classroom setting, enriched with multiple opportunities for interaction. In contrast to the primarily text-based format of WhatsApp, Adobe Connect provided a wider range of features, including live meetings with activated webcams, whiteboard tools, screen-sharing capabilities, and other interactive functions. Participants also underscored certain limitations associated with using WhatsApp for vocabulary learning, noting that its restricted modalities constrained interaction and engagement. This is evident in the following statement from Participant 8 (P8):

"Teaching and learning can take place through voice recordings or text messages on WhatsApp. However, there is no whiteboard for writing materials, which may make the experience boring. In this space, the teacher cannot control the students, who might chat with each other and waste time. They may also cheat since the teacher cannot carefully monitor them."

Owing to the classroom-like qualities of the Adobe Connect environment, participants asserted that learning vocabulary through this platform was considerably easier and more intuitive. They further noted that the familiar atmosphere not only diminished the sense of distance typically associated with online learning but also fostered greater motivation to actively engage in learning activities. In this regard, Participant 6 (P6) pointed out that:

"Adobe Connect was excellent, user-friendly, and highly useful. It felt like a real face-to-face class because we could see our teacher and had our microphones activated. Whenever we had questions or encountered any problems, the teacher enabled our microphones so we could ask directly. For teaching, the teacher used a whiteboard just like in a regular classroom. The written materials on the whiteboard were very helpful, making me feel truly immersed in the class. We could also record the sessions for later review."

Ultimately, the qualitative findings provide a detailed account of how the participants utilized both Adobe Connect and WhatsApp to develop their English vocabulary learning. The data suggest that the Adobe Connect platform, in particular, aligns closely with the learners' expectations for a learning environment that not only enables efficient access to instructional materials but also fosters meaningful interaction

with the teacher and peers. Besides, the participants demonstrated that Adobe Connect offered a structured and organized virtual space, which facilitated real-time communication, immediate feedback, and collaborative engagement, all of which contributed to an enhanced learning experience. Furthermore, the platform's features appeared to support diverse learning strategies, allowing learners to revisit content, engage in discussion, and clarify misunderstandings, thereby enhancing deeper comprehension and retention of new vocabulary. These findings highlight the potential of technology-mediated environments to meet learners' pedagogical needs while accommodating flexibility and convenience, suggesting that well-designed digital platforms might play a pivotal role in language learning contexts.

4. Discussion

This study aimed to investigate Iranian EFL learners' attitudes toward using social media applications for vocabulary learning and compare the effects of Adobe Connect and WhatsApp on vocabulary acquisition. The findings indicated that learners taught through Adobe Connect demonstrated significantly greater vocabulary improvement than those who used WhatsApp. Further, learners noted that access to written materials on a shared whiteboard, combined with real-time verbal explanations and immediate teacher feedback, fostered an active learning experience.

These results emanate from the fact that Adobe Connect provided synchronous, multimodal interaction, which not only allowed for visual and auditory stimulation but also promoted a physical classroom-like environment that helped learners process and retain new vocabulary more effectively. This richness of input and feedback likely contributed to deeper cognitive engagement, thereby fostering the internalization and long-term retention of lexical items.

On the contrary, although WhatsApp provided the convenience of access at any time and from anywhere, it did not support the level of interactive engagement required for robust vocabulary development. Its predominantly text-based nature restricted opportunities for immediate feedback and multimodal input, all of which are crucial for fostering deeper language development. Therefore, these findings suggest that the interactive features of Adobe Connect engaged cognitive processes to a greater extent, as the platform enabled language learners to experience richer forms of communication that more closely reflected authentic language use.

Learners from the Adobe Connect environment described their experience in terms that aligned with traditional face-to-face instruction. They emphasized that the rich, real-time interaction allowed them to ask questions immediately as clarifications were needed, which consequently, helped them reinforce new vocabulary more effectively. Consequently, these results suggest that the quality of digital interaction significantly influences learners' ability to acquire new language elements. Several Adobe Connect participants pointed out that interactive tasks, such as real-time discussions, group dialogues, and collaborative problem-solving exercises, along with the integrated use of visual aids like whiteboard illustrations, helped reinforce their understanding of new vocabulary items.

These findings emanate from the fact that when learners are engaged in an environment that supports multimodal learning experiences, they not only process information more deeply but also engage more thoroughly, thereby reinforcing their memory and understanding of new words (Jafari & Chalak, 2016). Vocabulary instruction that incorporates gestures, images, spoken examples, and interactive tasks tends to produce stronger retention and greater confidence in using new items across different communicative contexts (Jafari & Chakak, 2016).

When examining the dynamics of interactive learning, the enhanced performance demonstrated by the Adobe Connect group aligns with the literature (Rosell-Aguilar, 2018). Research has long suggested that when learners are provided with instructional tools that simulate traditional classroom dynamics, such as direct teacher-student interactions, immediate feedback, and visual aids, they are more likely to engage in meaningful learning experiences that enhance deeper vocabulary retention. These results emanate from the fact that the richness of the communication channel, particularly when it allows for simultaneous verbal and visual input, may significantly foster the processes of encoding and retrieval of new vocabulary.

In contrast, the performance of learners using WhatsApp highlights the platform's inherent limitations in facilitating tasks that require deeper cognitive engagement. The findings of this study demonstrated that the absence of integrated multimedia tools, such as interactive visuals or embedded practice activities, could restrict learners' ability to fully benefit from vocabulary instruction and may reduce opportunities for elaboration, contextualization, and retention of new vocabulary. Thus, although WhatsApp illustrates considerable strengths by offering pervasive access to content regardless of time and location, these advantages are insufficient to compensate for the lack of dynamic,

interactive features. When the instructional task requires sustained attention, active manipulation of input, and intensive cognitive processing, WhatsApp might prove inadequate for meeting learners' needs.

The results of this study are in line with the findings of Ko (2019) and Rosell-Aguilar (2018), who illustrated that digital platforms providing deeper synchronous interaction and multimodal resources tend to be more effective for language learning than platforms relying solely on text-based communication. Such platforms not only allow language learners to engage in real-time exchanges that foster authentic conversational settings but also integrate visual, auditory, and interactive elements that enhance comprehension and retention (Ko, 2019; Rosell-Aguilar, 2018).

The qualitative results revealed that many participants who experienced Adobe Connect described the learning process as engaging, noting that it allowed them to actively use new vocabulary in practical, spontaneous discussions. Accordingly, the interactive features of Adobe Connect have a significant impact on vocabulary acquisition. However, learners in the WhatsApp group stated that while they appreciated the platform's convenience, they often experienced delays when trying to obtain clarification or when engaging in complex language tasks. These results suggest that the immediacy of interactive communication is a critical factor in fostering the cognitive engagement required for effective vocabulary development.

In the same vein, Chen et al. (2019) highlighted that the integrated effect of real-time dialogue, multimodal content presentation, and teacher presence seems to act as a facilitator for deeper learning. The dynamic interplay of these components fosters an environment in which learners are continuously engaged and can immediately relate new vocabulary to real-world contexts (Chen et al., 2019).

On the other hand, several scholars put under the spotlight the substantial impact of technology, digital media, and online instruction on language development (Ahmadnejad et al., 2024; Alasal, 2025; Almeshmadi, 2024; Azizpour, 2021; Baleghizadeh & Saeedi, 2025; Jiang & Zhao, 2025; Khodabandeh, 2025). For instance, Azizpour (2021) conducted a qualitative study to examine Iranian EFL university lecturers' attitudes toward online instruction during the Coronavirus pandemic. Using a researcher-developed protocol, she conducted semi-structured interviews with 13 university lecturers from both the Karaj and Science and Research Branches of Islamic Azad University, in Karaj and Tehran, Iran. The participants, whose teaching experience ranged from 7 to 27 years, provided insights into their attitudes toward online instruction

during the COVID-19 outbreak. Employing an emergent methodological framework, the study classified the lecturers' value-laden comments into four principal attitudinal themes. The findings indicated that instructors require professional training on the latest technological updates to enhance online instruction. Further, the adequacy of technological infrastructure and the availability of free internet access were identified as critical factors that could facilitate online instruction during the COVID-19 outbreak (Azizpour, 2021).

5. Conclusion

This study aimed to investigate the comparative effects of two digital platforms, Adobe Connect and WhatsApp, on Iranian EFL learners' vocabulary acquisition and to explore their attitudes toward these two online instructional environments. The quantitative findings demonstrated that while both platforms produced statistically significant improvements in vocabulary acquisition, learners who engaged with Adobe Connect experienced significantly higher progress than those using WhatsApp. This difference can largely be attributed to the multimodal capabilities of Adobe Connect, including real-time audio-visual interaction, digital whiteboards, and virtual classroom sessions, which created a classroom-like experience. These features enabled immediate feedback, collaborative engagement, and deeper cognitive processing of the target vocabulary. In contrast, the WhatsApp platform, though more accessible and flexible, did not support the same level of interactive and integrative learning, ultimately resulting in limited vocabulary development. These results highlight the importance of the structural features and instructional potential of digital platforms as key determinants of their effectiveness in EFL vocabulary development.

The findings of this study have significant implications for EFL educators, teachers, learners, materials developers, curriculum designers, and administrators. Educators and curriculum designers are encouraged to integrate synchronous, multimedia-rich platforms such as Adobe Connect into their digital teaching practices, as these tools effectively replicate critical dynamics of face-to-face interaction that support vocabulary acquisition. Teachers should prioritize platforms that facilitate real-time feedback, collaborative problem-solving, and multimodal representation of new language items, as these elements enhance active engagement and foster retention. Equally important is the thoughtful alignment of tasks with the affordances of the chosen platform. Interactive dialogues, group discussions, peer feedback sessions, and visually supported activities can substantially develop learners' engagement with target vocabulary.

Besides, teacher presence remains critical; continuous facilitation in a synchronous environment might prevent misunderstandings and cultivate learner accountability. In essence, a deliberate combination of strategic task design, robust technological features, and proactive teacher facilitation creates a dynamic learning system that not only strengthens vocabulary mastery but also contributes to overall language proficiency, learner motivation, and engagement. This integrative approach aligns with the principles of multimedia learning and social constructivist theory, offering a practical framework for the development of technology-enhanced language curricula in diverse settings.

This study faced certain limitations. One notable limitation is that the research was conducted exclusively in Tehran, which may restrict the generalizability of the findings to language learners in other cities in Iran. Future researchers can select participants from various cities in Iran to enhance the generalizability of the findings. The next limitation of the study concerns the number of participants. Thus, future studies can include more participants to yield more generalizable results. Moreover, the treatment comprised only eight sessions, insufficient to explore long-term vocabulary retention or transfer to productive language use. Future research could address these limitations by employing larger and more demographically diverse samples and extending treatment durations to yield more generalizable results.

Funding: This research received no external funding from any agency.

Conflicts of Interest: The authors declare no conflict of interest.

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Appendices

Appendix 1. Coronavirus Vocabulary

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|--------------------------|--------------|-------|
| 1 Animal-human interface | 2 Antibodies | 3 Ban |
|--------------------------|--------------|-------|

4 Behavior	5 Body ache	6 Closure
7 Community spread	8 Contact tracing	9 Containment
10 Cool fact	11 Cough	12 Decree
13 Diagnose	14 Diagnosis	15 Disease
16 Distract	17 Droplets	18 Easing restrictions
19 Elderly	20 Epicenter	21 Essential
22 Equipment	23 Epidemic	24 Fatigue
25 Fatal	26 Fever	27 Fine
28 Fomites	29 First wave	30 Hand-gel
31 Handshakes	32 Herd immunity	33 Immunity
34 Incidence	35 Incubation period	36 Index case
37 Infectious	38 Isolation	39 Key worker
40 Lockdown	41 Mandatory	42 Mask
43 Mitigate	44 Mutation	45 Mutate
46 Novel	47 Outbreak	48 Overburden
49 Overwhelming	50 Pandemic	51 Painful
52 Patient zero	53 Pathogen	54 PCR test
55 Personal protective	56 Person to person	57 Physical distancing
58 Political	59 Prevent	60 Protect
61 Quarantine	62 Rapid	63 Respiratory
64 Risk	65 Second wave	66 Screening
67 Self-isolation	68 Self-quarantine	69 Shallow breaths
70 Sneeze	71 Social distance	72 Solidarity
73 Speed up	74 Spreading	75 Stock up
76 Swap-test	77 Strain	78 Surreal
79 Survival	80 Symptomatic	81 Symptoms
82 Tightness in chest	83 To ban gatherings	84 To flatten the curve
85 To protect the vulnerable	86 To restrict travel	87 Track
88 Transmission	89 Treat	90 Treatment
91 Trend	92 Unprecedented	93 Vaccine
94 Viral	95 Virus	96 Zoonotic