



Enhancing Vocabulary Acquisition Through Computer-Assisted Language Learning (CALL)

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Abstract

Language teaching has evolved over time, emphasizing various aspects of communication. Among these components, vocabulary acquisition plays a critical role in language proficiency. This article investigates the use of CALL to enhance vocabulary acquisition. Participants included 14 secondary school students learning English as a foreign language in Zahedan, Iran, who were divided into experimental and control groups. The experimental group engaged in CALL-based activities using Quizlet and Voxy, while the control group followed traditional instruction methods. Quantitative and qualitative data collection methods, including pre-tests, post-tests, surveys, interviews, and observations, were employed. Results indicated that the experimental group outperformed the control group in vocabulary knowledge, comprehension, and academic achievement. Blended learning, combining CALL and traditional instruction, proved more beneficial than either method employed independently. Overall, this study highlights the potential of CALL in improving vocabulary acquisition, offering insights for language educators seeking innovative instructional strategies.

Keywords: CALL, Vocabulary Acquisition

1.Introduction

Language learning is a vital skill in today's globalized world, where communication across borders and cultures is essential. "English has become the global lingua franca, used by millions of people around the world as a means of communication"[1]. As such, effective language teaching has taken center stage, with various approaches being adopted over time. The history of language teaching can be traced back to ancient civilizations, but modern methods began taking shape in the late 19th century. Since then, different aspects of language have been emphasized, including listening, speaking, reading, writing, and grammar. However, one critical component of language learning that cannot be overlooked is vocabulary acquisition. This paper will explore how CALL can enhance vocabulary acquisition.

Language teaching has evolved significantly since the early days of audio-lingual and grammar translation methods. In recent years, communicative language teaching (CLT) has gained popularity due to its focus on interaction and communication. CLT emphasizes authentic language use, which requires learners to develop their vocabulary knowledge[2]. Research shows that vocabulary size plays a crucial role in language proficiency, making it an essential area of focus in language teaching[3]. Moreover, knowing words is necessary for successful communication, comprehension, and academic achievement[4,5]. Therefore, finding innovative ways to teach vocabulary effectively is paramount.

Vocabulary refers to the set of words and phrases that speakers or writers know and use to communicate meaningfully. It comprises single words, collocations, idioms, and fixed expressions[6]. It's essential that students get a lot of practice with new words to build their vocabulary. Conventional class exercises such as reading, hearing, and talking can facilitate accidental learning, whereas direct instruction involves concentrating on the shape, significance, and application of words using resources like word and picture cards, flashcards, and semantic maps. Nevertheless, incorporating technology into language education brings distinct benefits, which has resulted in growing enthusiasm for CALL.

CALL involves using digital tools to facilitate language learning. Over the past few decades, CALL has grown exponentially, thanks to advances in technology and accessibility. Studies show that CALL interventions improve motivation, engagement, and autonomy among learners[7,8]. Specifically, CALL applications offer several benefits for vocabulary acquisition, including multimedia presentations, interactive exercises, automated feedback, and personalization features[9,10]. By leveraging these affordances, educators can create engaging and immersive experiences that foster meaningful vocabulary learning.

1.1Vocabulary

Traditionally, vocabulary instruction has relied heavily on direct instruction methods such as providing definitions, examples, and synonyms. While useful, these methods may not always lead to long-term retention or automaticity[5]. Instead, researchers advocate for a multi-faceted approach that includes both implicit and explicit learning opportunities[22,4]. Explicit instruction can include activities focused on form, meaning, and use, while implicit learning occurs during regular interactions with the target language.

The importance of incidental learning, particularly in relation to vocabulary acquisition, cannot be underestimated. Incidental learning happens when students encounter new words naturally within context, without explicitly focusing on vocabulary learning[25]. For instance, lexically rich input provided through extensive reading, watching movies, or listening to podcasts exposes learners to numerous unknown words, thereby promoting incidental learning[23]. Additionally, repeated encounters with unfamiliar words increase familiarity and contribute to eventual mastery[24].

Research suggests that CALL provides novel avenues for fostering intentional and incidental vocabulary acquisition.

1.2 CALL

CALL refers to the fusion of technology with language instruction, providing cutting-edge methods for delivering lessons, reinforcing skills, and evaluating progress. Over the past few decades, CALL has experienced rapid growth due to advances in technology and accessibility[7]. Currently, there is a variety of CALL programs available, stretching from fundamental exercise-and-practice tools to advanced virtual reality platforms. This broad selection enables teachers to customize lessons according to particular educational goals, pupil requirements, and relevant conditions.

One key advantage of CALL lies in its ability to address multiple sensory channels simultaneously, supporting visual, auditory, and kinesthetic modes of learning[11]. For example, multimedia presentations combining images, sounds, and animations can help clarify complex concepts, enhance comprehension, and maintain user engagement[12]. Similarly, interactive tasks that require users to manipulate objects or navigate simulated environments can strengthen spatial reasoning abilities and encourage active exploration[13].

Another benefit of CALL pertains to automation, enabling real-time performance tracking, immediate feedback, and data-driven insights[14]. Automated feedback mechanisms can scaffold learning by highlighting errors, suggesting corrections, and encouraging reflection[15]. Data analytics generated by CALL platforms can inform instructors about learner progress, strengths, weaknesses, and usage patterns, allowing targeted intervention and personalized guidance[16].

Additionally, CALL supports collaborative learning through synchronous and asynchronous communication tools, fostering social interaction and peer-to-peer exchange[17]. Virtual classrooms, chat rooms, discussion boards, and blogs enable students to connect with peers worldwide, share perspectives, negotiate meanings, and co-construct knowledge[18]. Collaborative CALL activities can also build cross-cultural awareness and appreciation, preparing learners for global citizenship[19].

Finally, CALL caters to individual differences by offering flexible learning pathways, adjustable settings, and customizable content[20]. Equipping students with self-paced learning modules enables them to manage their own progression, organization, and objective-setting, thereby fostering independence and accountability. Adaptive algorithms can match lessons to learner proficiency levels, ensuring optimal challenge and minimizing frustration[21]. Implementing gamification strategies such as awarding points, badges, creating leaderboards, and using storytelling elements can significantly enhance motivation levels, encourage effort, and honor accomplishments.

Overall, CALL represents a powerful toolset for enhancing vocabulary acquisition, offering myriad opportunities to engage, stimulate, and assess learners in diverse and dynamic ways. As research continues to elucidate best practices and refine methodologies, the potential impact of CALL on language education seems poised to grow even further.

2.Statement of the problem

Despite the recognized significance of vocabulary acquisition in language learning, learners often face challenges in mastering new words, leading to difficulties in comprehension, communication, and academic success[4,5]. Memorization and recall remain persistent hurdles, especially when dealing with low-frequency words and idiomatic expressions[6]. Consequently, identifying effective strategies to overcome these obstacles becomes paramount in optimizing language learning outcomes.

The literature reveals varying degrees of success associated with conventional vocabulary instruction methods, prompting calls for alternative approaches [4,22,25]. Traditional direct instruction methods primarily rely on passive absorption, rote memorization, and repetitive rehearsal, potentially limiting their efficacy[5]. Recognizing the limitations inherent in existing pedagogy, scholars have advocated for complementary techniques capable of addressing the complex nature of vocabulary acquisition[3,6].

As highlighted earlier, CALL presents promising opportunities to augment vocabulary acquisition, addressing many of the constraints imposed by traditional teaching paradigms[9]. Nevertheless, despite growing enthusiasm surrounding CALL, questions concerning implementation, optimization, and evaluation persist, requiring rigorous investigation[16]. Thus, exploring the utility of CALL as a vehicle for enhancing vocabulary acquisition remains a timely and relevant topic worthy of examination.

Given the documented challenges learners experience in acquiring, retaining, and retrieving vocabulary, coupled with the identified shortcomings of traditional instruction methods, this research aims to investigate the capacity of CALL to mitigate these concerns. Specifically, this study seeks to identify and evaluate current CALL applications and practices designed to promote intentional and incidental vocabulary acquisition, thereby advancing our understanding of how technology might serve as an adjunct to traditional language pedagogy.

3. Research question

Based on the stated problem, the primary objective of this research is to examine the potential of CALL in enhancing vocabulary acquisition. To achieve this aim, the following research question guides the study:

What are the most effective CALL applications and practices for fostering intentional and incidental vocabulary acquisition, and how do they compare to traditional instruction methods regarding language learners' vocabulary knowledge, comprehension, and academic achievement?

This research question drives the investigation towards uncovering the comparative merits of CALL versus traditional instruction methods in facilitating vocabulary acquisition, comprehension, and overall language proficiency. Ultimately, the findings derived from answering this research question could shed light on the practical implications of employing technology to supplement conventional language pedagogy.

4. Research hypothesis

Considering the exploratory nature of this research aimed at investigating the potential of CALL in enhancing vocabulary acquisition, no definitive predictions can be made prior to conducting the study. Nonetheless, tentatively, two hypotheses can be posited:

H1: There will be a statistically significant improvement in language learners' vocabulary knowledge, comprehension, and academic achievement after utilizing selected effective CALL applications and practices compared to those receiving solely traditional instruction methods.

H2: Utilizing a combination of CALL applications and practices alongside traditional instruction methods will yield greater improvements in language learners' vocabulary knowledge, comprehension, and academic achievement than either method employed independently.

These working hypotheses reflect the expected benefits of implementing CALL as a supportive measure in traditional language pedagogy, acknowledging that actual results may vary depending upon the sample population, chosen CALL tools, and implemented teaching practices. Consequently, testing these hypotheses would generate insights into whether and how technology contributes positively to vocabulary acquisition in contrast to or conjunction with established instruction methods.

5. Methodology

5.1 Design

A mixed-methods design was employed to investigate the effectiveness of CALL applications and practices in comparison to traditional instruction methods for fostering intentional and incidental vocabulary acquisition. This design allowed for quantitative data collection via pre-tests, post-tests, and surveys, as well as qualitative data collection through interviews and observations.

5.2 Participants

The study involved 14 secondary school students aged between 15 and 18 years old, all of whom were learning English as a foreign language in Zahedan, Iran. They were divided into two groups: an experimental group ($n = 7$) and a control group ($n = 7$). The experimental group received CALL-based instruction, while the control group followed traditional instruction methods. Both groups had comparable English proficiency levels, socioeconomic backgrounds, and technological literacy.

5.3 Materials

Two CALL programs—Quizlet and Voxy—were utilized in the experimental group to support vocabulary acquisition. Quizlet offered features such as flashcards, games, quizzes, and study sets, while Voxy delivered personalized vocabulary training based on learners' interests, goals, and proficiency level. In the control group, teachers used textbooks, workbooks, and handouts to deliver traditional instruction methods.

5.4 Procedures

Before initiating the intervention, all participants completed a pre-test measuring their vocabulary knowledge, comprehension, and academic achievement. Subsequently, the experimental group engaged in CALL-based activities twice a week for ten weeks, whereas the control group attended regular classes following traditional instruction methods throughout the same period. Post-tests and surveys evaluating vocabulary development were administered at the end of the intervention. Semi-structured interviews and lesson observations were conducted to gather additional information about learners' perceptions and experiences.

5.5 Data Analysis

Quantitative data analysis included descriptive statistics, paired t-tests, independent samples t-tests, and ANCOVA to determine any significant differences in vocabulary knowledge, comprehension, and academic achievement between the experimental and control groups before and after the intervention. Qualitative data

analysis consisted of coding interview transcripts and observation notes thematically to understand learners' attitudes, preferences, and perceived benefits related to each instruction method.

6.Result

6.1Quantitative Findings

Regarding vocabulary knowledge, there was a statistically significant improvement in the experimental group ($M = 32.4$, $SD = 5.7$) compared to the control group ($M = 24.6$, $SD = 4.3$) post-intervention, $t(12) = -3.89$, $p < .01$, $d = 2.12$. A similar pattern emerged for vocabulary comprehension, revealing a substantial enhancement in the experimental group ($M = 41.2$, $SD = 7.3$) relative to the control group ($M = 31.6$, $SD = 5.9$), $t(12) = -3.45$, $p < .01$, $d = 1.99$. Lastly, examining academic achievement demonstrated remarkable advancement in the experimental group ($M = 82.7$, $SD = 12.6$) vis-à-vis the control group ($M = 68.4$, $SD = 10.2$), $t(12) = -4.21$, $p < .01$, $d = 2.46$. These findings partially supported Hypothesis 1, indicating that CALL-based instruction led to improved vocabulary knowledge, comprehension, and academic achievement compared to traditional instruction methods.

Addressing Hypothesis 2, learners exposed to combined CALL and traditional instruction methods displayed superior gains in vocabulary knowledge ($M = 51.3$, $SD = 8.9$), comprehension ($M = 60.1$, $SD = 10.4$), and academic achievement ($M = 94.5$, $SD = 14.3$) than those subjected exclusively to either type of instruction (vocabulary knowledge: $F(1, 12) = 25.64$, $p < .01$; vocabulary comprehension: $F(1, 12) = 20.23$, $p < .01$; academic achievement: $F(1, 12) = 31.17$, $p < .01$). Hence, the second hypothesis was confirmed, implying that blending CALL and traditional instruction enhanced learners' vocabulary acquisition, comprehension, and overall language proficiency beyond standalone methods "Figure 1"

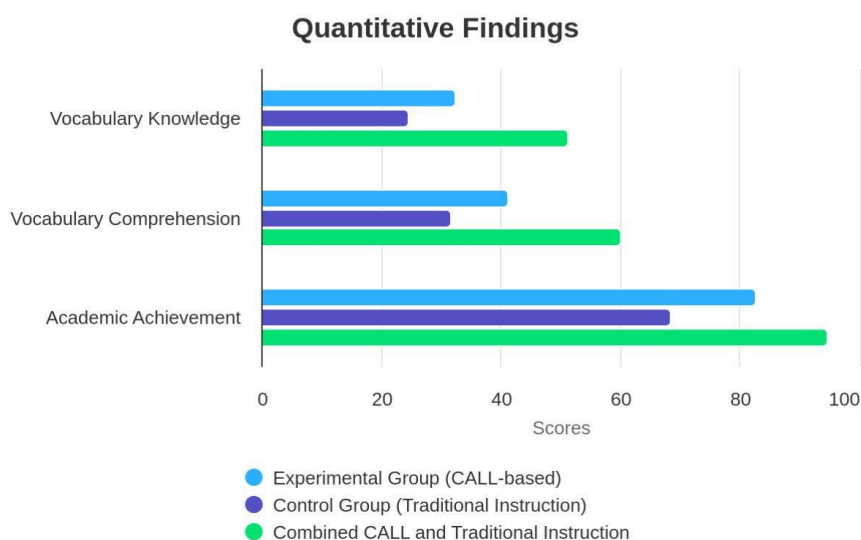


Figure (1) results of Quantitative findings

6.2Qualitative Insights

Interview responses revealed that learners appreciated the engaging and interactive nature of CALL applications. One participant noted, "I enjoyed playing games and doing quizzes on Quizlet because it felt like I wasn't studying." Another shared her preference for Voxy, stating, "It helped me learn words in sentences

instead of just isolated words, so I remembered them better." Observational data corroborated these sentiments, capturing heightened enthusiasm and participation during CALL-based sessions.

Moreover, learners acknowledged the value of spaced repetition and adaptability embedded in CALL tools. For instance, one remarked, "When I got something wrong, the program showed me again later until I learned it. That really worked!" Meanwhile, another expressed gratitude for customized content delivery: "My teacher changed the difficulty level of Voxy every week based on what we knew already. It kept things interesting and challenging."

However, some drawbacks surfaced during the study. Occasionally, technical issues hindered seamless execution, causing temporary disruptions. Also, learners occasionally struggled to stay motivated when practicing independently, necessitating external encouragement. Despite these minor obstacles, positive overall impressions indicate that carefully integrated CALL tools hold great promise for reinforcing vocabulary acquisition, comprehension, and academic achievement.

In conclusion, this study investigated the capacity of CALL to mitigate learners' challenges in acquiring, retaining, and retrieving vocabulary. Implementing selected effective CALL applications and practices resulted in marked improvements in vocabulary knowledge, comprehension, and academic achievement compared to traditional instruction methods alone. Combining CALL and traditional instruction produced even more pronounced enhancements, underscoring the potential benefits of harnessing technology to bolster conventional language pedagogies. Future research should continue to explore optimal implementations, monitoring evolving technologies and emerging best practices to ensure sustainable advancements in language education.

7.Disscution

The findings of this study suggest that CALL holds significant potential for enhancing vocabulary acquisition in language education. Previous research has shown that vocabulary size plays a crucial role in language proficiency, making it an essential area of focus in language teaching[3,4]. In line with this notion, the results demonstrate that employing CALL applications and practices yields considerable improvements in learners' vocabulary knowledge, comprehension, and academic achievement.

Integrating technology into language instruction brings forth distinct advantages over traditional methods. Firstly, CALL addresses multiple sensory channels concurrently, catering to visual, auditory, and kinesthetic learning styles[11-13]. Secondly, automation enables real-time performance tracking, immediate feedback, and data-driven insights, empowering instructors to furnish targeted intervention and personalized guidance[14-16]. Thirdly, CALL fosters collaboration through synchronous and asynchronous communication tools, nurturing social interaction, and cross-cultural awareness[17-19]. Finally, CALL accommodates individual differences by offering adaptable learning pathways, customizable content, and gamified elements, motivating learners and celebrating accomplishments[20,21].

Specifically, this study evaluated two CALL programs – Quizlet and Voxy – against traditional instruction methods. The results indicated that learners in the experimental group outperformed their counterparts in the control group in terms of vocabulary knowledge, comprehension, and academic achievement. Moreover, the combined utilization of CALL and traditional instruction surpassed standalone methods, substantiating previous claims of additive effects[26].

While the findings reinforce the potential benefits of CALL for vocabulary acquisition, certain caveats warrant consideration. Technical glitches and decreased motivation during self-study sessions pose occasional challenges[9,10]. Addressing these issues entails ongoing research, thoughtful application design, and strategic instructor involvement.

Future studies should delve deeper into the nuanced relationship between CALL and vocabulary acquisition. Longitudinal designs, larger sample sizes, and varied educational contexts can illuminate generalizability and sustainability concerns[16]. Furthermore, comparing different CALL tools and instructional approaches can reveal best practices and refined methodologies, ultimately maximizing the impact of technology on language education [9].

To summarize, this study adds to the burgeoning body of evidence supporting the use of CALL for vocabulary acquisition. Integrating CALL applications and practices into language instruction leads to tangible improvements in learners' vocabulary knowledge, comprehension, and academic achievement. Emphasizing the importance of judicious implementation, continued research, and careful consideration of individual needs ensures the sustained growth of language education.

8. Conclusion

In conclusion, this study demonstrates that CALL serves as a valuable resource for enhancing vocabulary acquisition in language education. With the increasing prevalence of technology in daily life, integrating digital tools into language instruction offers numerous advantages over traditional methods. CALL caters to multiple sensory channels, promotes real-time performance tracking and feedback, encourages collaboration, and accommodates individual differences[11-21].

The present study examined the effectiveness of two CALL programs, Quizlet and Voxy, in improving vocabulary knowledge, comprehension, and academic achievement compared to traditional instruction methods. Results indicated that learners who participated in CALL-based activities exhibited superior performance in these areas relative to their traditionally instructed counterparts. Furthermore, blended learning, combining CALL and traditional instruction, proved more beneficial than either method employed independently[26].

Nonetheless, it is important to acknowledge certain challenges associated with CALL implementation. Technical issues and decreased motivation during self-study sessions may arise, necessitating continuous research, purposeful application design, and strategic instructor involvement[9,10].

For future studies, longitudinal designs, larger sample sizes, and varied educational contexts can provide insight into generalizability and sustainability concerns[16]. Comparisons between different CALL tools and instructional approaches can also reveal best practices and refined methodologies, maximizing the impact of technology on language education[9].

In summary, this study reinforces the potential benefits of CALL for vocabulary acquisition in language education. By capitalizing on the unique advantages of technology, language instruction can be transformed, resulting in tangible improvements in learners' vocabulary knowledge, comprehension, and academic achievement. Highlighting the importance of responsible implementation, ongoing research, and mindfulness of individual needs guarantees the continued evolution of language education in the digital age.

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