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**The Effects of Using Computer-Assisted Language Learning to Teach Vocabulary to EFL Students**

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**Resumen**

Las diferentes metodologías empleadas por los docentes de idiomas a través de los años han evolucionado y modernizado notablemente. Actualmente, docentes y estudiantes disponen de una variedad de medios, especialmente tecnológicos, como computadoras y programas dedicados a la enseñanza y aprendizaje de diversos idiomas. Por lo tanto, la presente síntesis de investigación explora la importancia de la enseñanza del vocabulario como una base fundamental para la adquisición de todas las habilidades lingüísticas, especialmente en estudiantes de inglés como lengua extranjera (EFL, por sus siglas en inglés). Además, presenta el enfoque de enseñanza asistida por computadora (CALL, por sus siglas en inglés) empleado por los docentes para la adquisición de vocabulario. Como resultado, se exponen las posibles ventajas y desventajas de la aplicación de CALL, al igual que una recopilación de software y sitios web que pueden utilizarse en el aula y/o en el hogar como fuentes complementarias para la instrucción.

*Palabras clave del autor:* métodos de enseñanza, recursos tecnológicos, enseñanza de vocabulario, inglés como lengua extranjera (EFL)

**Abstract**

The different methodologies used by language teachers over the years have evolved and modernized significantly. Currently, teachers and students have a variety of means, especially technological, such as computers and programs focused on the teaching and learning of languages. Therefore, this research synthesis explores the importance of vocabulary teaching as a fundamental basis for acquiring all linguistic skills, especially in learners of English as a Foreign Language (EFL). Additionally, it focuses on the Computer-Assisted Language Learning (CALL) approach teachers use for vocabulary acquisition. As a result, the advantages and disadvantages of CALL are presented, along with a collection of software and websites that can be used in the classroom and/or at home as complementary sources for instruction.

*Author Keywords:* teaching methods, technological resources, teaching vocabulary, english as a foreign language (EFL)

## Table of contents

## List of tables

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**Dedication**

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## Introduction

Acquiring an extensive vocabulary is of prime importance, as each word enables speakers to convey meaning effectively (Alqahtani, 2015). Consequently, lexical knowledge becomes fundamental for the acquisition of all linguistic skills, including reading, writing, listening, and speaking in a second or foreign language. As a result, students enhance their communicative competence, enabling them to articulate their ideas. Moreover, the methodology employed in vocabulary instruction is also crucial. Traditionally, teachers have relied on memorization and translation as the primary strategies for vocabulary teaching. However, the efficacy of instruction is heavily dependent on the methodologies utilized. Therefore, researchers have committed to modernizing education by integrating computer technologies because students currently have more access to technological resources and online activities (Susanto, 2017).

This research synthesis covers five chapters of the Computer-Assisted Language Learning (CALL) approach and its primary sources used by instructors. The research description, comprising the background, problem statement, justification, research questions, and objectives, is addressed in the first chapter. Additionally, two significant subjects are discussed in the second chapter: a) the theoretical framework and b) the literature review. Relevant concepts about the value of vocabulary instruction and the background of CALL are covered in the theoretical framework section. Then, important research findings on the effectiveness and the most frequent CALL resources that teachers use are included in the literature review. The third chapter indicates the methodology employed to develop this research synthesis. Furthermore, the analysis of the collected data that answers the research questions is shown in chapter four. Finally, conclusions and recommendations are discussed in the fifth chapter.

# CHAPTER I
# Description of the Research

## Background

Computer-Assisted Language Learning (CALL) is an approach to learning or teaching foreign languages that makes use of computer technology (Maftoon et al., 2015). Similarly, Shokrpour et al. (2019) remarked that CALL is a procedure in which the students are involved with all aspects of computer implementations to improve students' language.

Although computers have been employed for language teaching since the 1960s, nowadays technology, computers, and software have opened a fresh outlook to language teaching and learning (Maftoon et al., 2015). Besides, a study conducted by Nejati and Jahangiri (2018) alluded that CALL programs offer the public immediate feedback that students require since all the information is provided in a short amount of time. Nevertheless, Sedaghatkar (2018) mentioned that a limitation of the CALL approach is the lack of student learning experience with technology. Some of the students deal with this problem since not everyone has access to computers and everything that CALL demands.

In terms of lexis for language learning, Bagheri et al. (2012) interpreted it as a core component of language proficiency that provides much of the basis for how well learners speak, listen, read, and write. Similarly, Susanto (2017) remarked that mastering vocabulary is crucial for students to learn the language because it is needed to express ideas and to be able to understand other people.

In the same way, Hanafiah et al. (2022) emphasized that CALL has a key role in the acquisition of an extensive range of lexicon, which additionally facilitates communication between teachers and learners. Also, the authors mentioned that CALL helps students increase their autonomous learning abilities since they can develop activities at their own pace. Furthermore, multimedia is a component of CALL, and as Zarei and Mahmoodzadeh (2014) highlighted, multimedia can contain images or even music to keep students engaged and motivated with the subject matter. Hence, multimedia helps educators to create enjoyable lessons in a pleasant environment. Based on the studies already described, some of the tools that CALL involves are *Tell Me More* (TMM), *Memrise, and Rosetta Stone* which offer support for vocabulary teaching and learning since they help to practice the four macro skills, maximizing the vocabulary learning experiences.

**Problem Statement**

Vocabulary plays an important role in language proficiency. It is believed that the more vocabulary EFL learners master, the better they develop the four language skills: listening, speaking, reading, and writing (Patahuddin et al., 2017). Likewise, Lolita et al. (2020) commented that English teachers put more emphasis on the four language skills, giving little attention to vocabulary. As a result, they found that students are not able to keep an appropriate conversation or make use of the language efficiently. A similar idea is mentioned by Wu (2015), who said that the degree of lexis acquisition affects the accuracy and efficiency of language communication, including language comprehension and production.

One factor that influences vocabulary acquisition and mastery, according to Renandya and Widodo (2016), is the implemented teaching methods due to their possible ineffectiveness and invariance since their application often tends to focus only on some aspects of the language while neglecting others. For instance, recent studies on vocabulary mastery (Lolita et al., 2020; Nejati & Jahangiri, 2018) indicated that the traditional method might be considered ineffective because its process turns out to be monotonous for some students, developing non-optimal learning results (translation and memorization). Although it is useful in some cases, it is no longer considered the only method to teach vocabulary. In contrast, due to current technological development, CALL is suggested as an alternative method. The employment of computers in an educational setting has increased dramatically in the last two decades due to the combination of educational needs and technological means (Naraghizadeh & Barimani, 2013).

Particularly, CALL has the potential to significantly enhance students' vocabulary retention both immediately and over time, as suggested by Sedaghatkar (2018). By deploying computer technology, students gain access to a wide range of user-friendly, often free, and engaging sources that inspire them to expand their vocabulary and deepen their comprehension. Furthermore, these tools, catering to both synchronous and asynchronous learning, can be utilized within the classroom environment or beyond, empowering students to take charge of their own learning experiences (Lolita et al., 2020; Nejati & Jahangiri, 2018).

However, the implementation of CALL in the classroom is not always easy. Soon and Park (2009) presented two types of aspects that might affect the successful integration of technology in the classroom: a) *Internal aspects* refer to the perceptions, attitudes, and preferences of teachers regarding the variety of teaching methods, which means that some instructors feel more comfortable using other methods that do not feature working with computers. Consequently, the application of CALL in classrooms is hindered. On the other

hand, Soon and Park (2009) indicated that the teachers who support CALL (or those who want to try it) sometimes do not have access to technological training and/or equipment.

Furthermore, Soon and Park (2009) showed *b) external aspects* such as financial problems, insufficient materials and time, lack of technical support, poor Internet access, limited capacities of the school network, and inflexibility of the curriculum. Similarly, AbuSeileek and Abu Sa'aleek (2012) mentioned that the difficulty of integrating technological resources into classrooms depends on the amount of time and knowledge required to develop CALL programs, raising significant concerns about the expensive cost to cover all the technological implements and further instruction. Consequently, it is required for instructors to be proficient in technological and pedagogical areas.

**Justification**

Vocabulary is regarded as a highly effective communicative tool, since it is the most important aspect of people's oral communication (Elmahdi & Hezam, 2020). However, as Elmahdi and Hezam (2020) mentioned, teachers question themselves about the proper procedure to teach students to achieve satisfactory results. They suggested that the instructor must plan adequate approaches to apply with the students. According to Gilakjani (2014), in recent years, research on the influence of technology in education has been rising, allowing teachers to discover these innovations and apply them to their instructional practices.

Thus, this research synthesis is based on CALL, an approach for teaching and learning foreign languages, in which computers, computing platforms, and information technology are used to present and evaluate language (Suresh & Sreehari, 2011, as cited in Babu & Komuraiah, 2011). The reason this approach was chosen is that working with computers allows the students to learn through interactive lessons, which exerts a better effect on contextualized vocabulary learning than the ordinary methods which are focused on learning vocabulary through bilingual lists (Bagheri et al., 2012). Also, the authors mentioned that CALL enables students to learn on their own because it encourages them to participate actively due to the wide variety of materials that can be creatively produced using this approach.

Studies centered on the application of CALL highlight that it can be utilized to reinforce what has been learned in the classroom, or as a recovery tool to help students who require additional support and help (Benyo, 2020). Furthermore, technological devices like computers can provide instruction as well as feedback and testing for learners (Wu, 2015). Likewise, Mutlu and Eroz-Tuga (2013) remarked that technology seems to encourage students' autonomy by giving them the responsibility to choose the time, place, and circumstances that

lead to their learning; thereby, helping the teacher to assess students' autonomous learning process.

Therefore, we believe that by conducting this research synthesis and gathering specific information about the effects of CALL on the learning of vocabulary by EFL students, it will be possible to demonstrate whether its application is recommended. Based on that, we want to show EFL teachers and future teachers the effects (positive or negative) of using this approach so that they can analyze them and decide if this approach is suitable for their students.

**Research Questions**

1. What are the reported effects of CALL as an approach for teaching vocabulary to EFL students?
2. What are the main CALL resources used by instructors while teaching vocabulary to EFL students?

**Objectives**

**General:**

To analyze the effects of CALL on teaching vocabulary to EFL students.

**Specific:**

To synthesize the positive or negative effects of CALL as an approach for teaching vocabulary to EFL students.

To identify the main CALL resources used by instructors while teaching vocabulary to EFL students.

# CHAPTER II
# Theoretical Framework and Literature Review

## Theoretical Framework

### Vocabulary Teaching

Many years ago, the methods used by instructors to teach English vocabulary were significantly different from those employed today (Elmahdi & Hezam, 2020). At that time, teachers primarily relied on the grammar-translation method along with memorization. This approach often resulted in poor long-term retention of vocabulary, limiting students' ability to apply the learned vocabulary effectively in their activities (Elmahdi & Hezam, 2020). Similarly, students were taught through bilingual word lists, dictionary study, memorization, and their translation counterparts, with little consideration for context or real-life speech (Amiryousefi & Dastjerdi, 2010). Elmahdi and Hezam (2020) noted that when teachers use outdated and traditional methods, students often lose interest in what they are learning.

In contrast, technology has significantly influenced education today; computers, apps, programs, and other technological tools have become highly important. As a result, new approaches have emerged to innovate instruction with their contemporary features (Talebi & Teimoury, 2013). Moreover, Ghasemi and Hashemi (2011) stated that technology provides learners with up-to-date data and a wealth of readily available information, which captures students' attention more effectively.

Vocabulary is crucial to support the four main skills: listening, reading, writing, and speaking (Patahuddin et al., 2017). In the same way, vocabulary could define the mastery of the language. A larger vocabulary indicates greater skill, which correlates to the ability to comprehend and articulate concepts in an academic setting (Coxhead, 2021). Nevertheless, the acquisition of vocabulary does not only involve knowing the meaning of a word; vocabulary involves knowledge and understanding of how a word functions within the language in society (Cummings et al., 2018). However, if students have a lack of vocabulary, it may limit their capacity to communicate and comprehend chunks of data or complete messages (Hanafiah et al., 2022).

Additionally, vocabulary is considered the building block of a language since the lack of it will certainly cause difficulties in learning other aspects of the language (Nejati & Jahangiri, 2018). This underscores the fact that Lolita et al. (2020) expressed that sometimes students struggle to talk, comprehend, and even write in English since they have a restricted vocabulary that limits them from being able to choose or pronounce words appropriately. Consequently, Yunus

et al. (2016) affirmed that using CALL to acquire vocabulary is more advantageous and useful for students than other approaches.

**CALL Approach**

CALL is an unstructured field of instruction due to the continual development of both pedagogy and technology, with the latter focusing on improving students' language skills by using solely computers (Beatty, 2010). Additionally, Torsani (2016) emphasized that CALL involves a variety of computer and other technological equipment applications to teach a language. Conversely, Hanafiah et al. (2022) stated that CALL serves as a tool to think in a personalized way and maintain an effective practice in a real context with proper feedback. Due to its flexibility, CALL develops cooperative learning, allowing students to work in pairs or groups and encouraging interaction and motivation to learn.

Similarly**,** Warschauer and Healey (1998, as cited in Benyo, 2020) claimed that CALL employs a variety of information and communication technologies (ICT) applications to teach foreign languages throughout various stages: *Behavioristic CALL, Communicative CALL,* and *Integrative CALL.* Maftoon et al. (2015) stated that these three stages were developed according to the advancement of technology and pedagogical approaches.

*Behavioristic CALL* is based on stimulus-response orientation through repetitive activities of language exercises on the computer (Yamazaki, 2014). Similarly, Benyo (2020) stated that Behavioristic CALL incorporates drill exercises and materials in which the computer leads the teaching process; that is, the computer program examines students' responses and offers feedback through assistance screens and remedial tasks.

On the other hand, Yang (2010) explained that *Communicative CALL* focuses on implicit teaching, with computer activities, emphasizing the authentic practice of language, thus reinforcing instructions, allowing and encouraging students to build their knowledge and not just repeat what has already been established. Similarly, Communicative CALL is integrated with cognitive theories, describing learning as an exploration and development process (Sedaghatkar, 2018).

Following the next stage, *Integrative CALL* combines the four main English skills and technology in a most significant learning process (Yang, 2010). Similarly, Sedaghatkar (2018) stated that using task-based, project-based, and content-based approaches creates a more engaging environment. In that way, CALL merges with a socio-cognitive approach remarking the use of the language in a social context. Likewise, Yamazaki (2014) noted that Integrative CALL emphasizes the setting in which interaction takes place because of the advantages

offered which are tangible and direct experiences, students' autonomy, engagement, and motivation.

## Literature Review

The following section is a compilation of the bibliographic contributions related to the use of CALL as an approach for teaching vocabulary to EFL learners. This review of the literature first encompasses research on the impact of CALL and its effects on students' language development and the resources utilized to teach vocabulary. And second, certain limitations that CALL has in the field of this research.

### The Effects of CALL on Vocabulary Mastery

Research on the effectiveness of CALL in language teaching has been undertaken. Sedaghatkar (2018) conducted a study to determine the effects of CALL on immediate and delayed retention of vocabulary skills. In this research project, 58 Iranian participants from Payam Noor University were divided into two groups: the control and experimental groups. For a month, both groups received vocabulary instruction; the control group learned with copies, while the other group used unknown software. After a month, students took a post-test in which the experimental group scored 29.46 and the control group 26.99 (both out of 100). Even though the difference was not considerable, it was significant enough for the researchers to come up with the conclusion that CALL engaged students to immediately learn and increase vocabulary in an enjoyable environment.

In the same way, Emami and Amirghasemi (2022) conducted a study in which 60 students participated. The treatment phase focused on teaching 50 words selected from the *Interchange 2* book, for 5 weeks. The participants were divided into two groups: the experimental group (30 students) had contact with computer technology. However, the control group (30 students) had access just to the physical book. Regarding the results, the average scores in the post-test of the two groups were different: the experimental group outperformed the scores of the control group by 60%. Thus, this study demonstrated that CALL facilitated more word retrieval than conventional teaching methods.

Likewise, Ono (2017) carried out research whose purpose was to explore the impact of Memrise (CALL software) on memory retention and learning challenging vocabulary. In this case, 26 EFL learners had to study 400 words from the TOEFL using the above software during a semester. After this exposure, students took a test in which the results showed that Memrise helped students to learn complicated and long words, impacting their memory retention with 75% accuracy.

The short and long-term effects of integrating computer-based vocabulary activities and length of exposure were also reported by Sadeghi and Dousti (2014). In their study, there were two experimental groups (EG) and one control group (CG), with 15 students in each one. The experimental groups used the *Family and Friends 2* (studentMultiRom) for 6 weeks and were exposed for fifteen minutes (the 1st EG) and thirty minutes (the 2nd EG). Meanwhile, the control group had paper-based activities for fifteen minutes. The study concluded that computer-based activities were more effective in the Iranian EFL context and that longer exposure to CALL resources led to better results. Also, a positive impact was reported on student motivation by using them.

Similar conclusions were found in a study conducted by Nejati and Jahangiri, (2018), whose objective was to examine the impact of CALL on vocabulary instruction. For the entire study, 40 students at the Iran Language Institute were selected. The results concluded that the participants who learned and retained more vocabulary were those who worked with *Vocaboly* software. Furthermore, the outcomes demonstrated that during the software implementation process, the students' motivation increased, facilitating the acquisition of vocabulary and helping them gain a certain degree of autonomy by having control over their learning process.

In a related study, Lolita et al. (2020) investigated the effectiveness of CALL with 92 participants from an Indonesian school. For that purpose, three groups took part in the study: group A (30 students), group B (32 students), and the remaining 30 members comprised group C. All the participants received instruction with *Hot Potatoes* software for six months. After using computers in the classrooms, results showed that the three groups improved their vocabulary significantly. Although group C had the most rise, increasing 28.3% from the start. Also, Lolita et al. (2020) mentioned there was an increase in pupils' autonomy, motivation, and self-assurance to broaden their vocabulary.

Wu (2015) employed an empirical study to discover the effects of CALL on Self-directed FL vocabulary learning. The participants (61 students from a university in China) were split into two groups. The control group used printed material. However, the experimental group took advantage of an electronic notebook called *Learning Vocabulary in Domain* during their self-directed instruction. The findings showed that students in the experimental group felt more excited than those in the control group. Also, the instant feedback they received regarding their responses was greatly valued, and they were encouraged to grasp more words. Subsequently, Wu (2015) concluded that CALL can fully support self-directed vocabulary acquisition, having a positive view for students.

Additionally, Shokrpour et al. (2019) carried out a study that aimed to investigate the effectiveness of CALL on Iranian EFL learners' vocabulary learning. For that purpose, 50 participants (students at institutes in Shiraz) were divided into two groups: a control and an experimental group. The experimental group was taught vocabulary using CALL, while no software was utilized with the control group. According to the study's findings, pupils who utilized computers to increase their vocabulary performed better, which means there was less than a 5% chance of difference from those who exclusively interacted with textbooks. Therefore, they concluded that CALL encouraged participants to learn vocabulary with definitions, images, and short video clips during instruction, although the difference is not especially major.

Moreover, Çakmak et al. (2021) investigated the effect of applying CALL in L2 vocabulary learning. The participants involved in this project were 76 pre-intermediate EFL students. They were randomly distributed into two groups: the experimental group (EG), 38 individuals, and the control group (CG), with the same amount. The CG received conventional instruction, while the EG was asked to use *Mnemosyne,* a computer-enhanced flashcard software program, on their devices. After the treatment phase, the EG outperformed by 15% of the CG. Therefore, the researchers concluded that CALL engaged students in the learning process more than traditional methods by completing interesting tasks, receiving feedback, and improving their performance.

In a similar way, Pahlavanpoorfard and Soori (2014) investigated the effectiveness of CALL by comparing it with traditional instruction for vocabulary development in Iranian students. Forty participants were divided into two groups of 20 students each: an experimental group (EG) and a control group (CG). The EG was exposed to an unknown computer software for ten weeks. The study concluded that the EG had a better performance than the CG as they gained more vocabulary and established that the EG could control their learning during the application of the software. Finally, Pahlavanpoorfard and Soori (2014) stated that CALL can create a deeper and more meaningful learning experience.

Naraghizadeh and Barimani (2013) investigated the effectiveness of CALL by comparing it with traditional instruction for vocabulary development. Sixty Iranian students were divided into 2 groups, comprising 30 participants in each one. The experimental group (EG) was exposed to the Tell Me More (TMM) software while the control group (CG) worked with the Tell Me More book. Both groups covered the vocabulary of nine chapters of the book. The study concluded that several CALL programs, especially those that incorporate multimedia elements such as Tell Me More, improve vocabulary learning more effectively than traditional textbooks.

Additionally, integrating different types of digital media increases the probability of word retention among students.

Mousavi and Nemati (2017) also conducted research into the effectiveness of CALL versus traditional textbook-based vocabulary instruction. In this study, *504 Absolutely Essential Words* software was used to improve the vocabulary acquisition of Iranian EFL learners. Fifty-four students from the Mehr Institute, in Izeh, were distributed into an experimental and a control group, each consisting of 27 participants. The findings highlighted an inequality in post-test scores between the experimental group (mean score of 33.74/50) and the control group (mean score of 30.26/50). Therefore, this study emphasizes the role of technology in increasing vocabulary acquisition, as it motivates students to constant practice with the goal of achieving high grades.

Also, intending to identify whether the CALL approach is more effective than traditional ones in teaching vocabulary to EFL learners, Delavari and Pourhosein (2022) conducted a study with 80 English learners at the Parsian Institute of Iran for 6 weeks. The participants were divided into two groups: the experimental and the control group (40 students each). Experimental students were immersed in different tools on the computer and the *Narsis* software. However, the control group was exposed to a traditional approach (oral pronunciation and translation of words). Compared to the control group, the results showed a significant improvement in vocabulary development in the experimental group, with a difference of 10.95%. One positive effect found in the study was the exposure to understandable and authentic information, which increases students' motivation, autonomy, and engagement in learning.

Additionally, Khoshnoud and Karbalaei (2015) conducted research at the Qalame Bartar Language Institute in Iran to determine whether CALL can enhance vocabulary learning in the EFL context. Sixty students were divided into an experimental group (34 participants) and a control group (26 participants). The experimental group had access to the *Learn That Word* website for 3 weeks. On the other hand, the control group was asked to use printed material. Results of the study indicated that the use of CALL during instruction significantly facilitated vocabulary acquisition by developing students' ability to recognize and relate different words to images in a variety of contexts. Furthermore, the researchers stated that CALL can complement vocabulary instruction, allowing students to be active and autonomous learners.

Moreover, Hanafiah et al. (2022) developed research to examine the effects of CALL on Indonesian EFL learners' vocabulary learning. To conduct this investigation, 60 Indonesian EFL students were divided into a control group and an experimental group (30 participants

each). The same lessons were chosen for the study, in which the experimental group received online education via *Skype* and the control group received face-to-face classes for 17 days. The control group got (14.36 mean score out of 30) and the experimental group (17.13 mean score out of 30). As a result, they concluded that CALL excelled in giving students a sense of autonomy in the learning process, but they also suggested combining CALL with traditional instruction to improve it.

Similarly, Enayati and Gilakjani (2020) stated that Tell Me More software can be useful for learning English as it improves proficiency. The goal of their study was to explore the effects of CALL on improving intermediate EFL learners' vocabulary learning. Sixty-one Iranian students were split up into two groups: a control group (30 participants) and an experimental group (31 participants). For 6 weeks, the experimental group used Tell Me More (TMM) software, while the control group used synonyms, antonyms, and matching strategies. Results indicated that using CALL exposed students to a simulated approach of word association with real-life images and sounds, allowing students to learn vocabulary through experience, and reinforcing students' memory retention.

To evaluate the impact of computer educational software on language teaching, with a specific focus on vocabulary acquisition, Sharifi et al. (2015) conducted a study on the use of Rosetta Stone software. For that purpose, 60 participants were divided into a control and an experimental group (30 students each). The treatment phase lasted 6 weeks, in which the experimental group used Rosetta Stone, while the control group was instructed using the teacher-led method. The results revealed that the experimental group outperformed the control group: the mean score of the experimental group was 40.65 out of 50, exceeding those of the control group, which was 29.90 out of 50, suggesting a positive impact of the computer-assisted approach. This impact focused on students' control over their learning process, which could have promoted student motivation.

Wang and Lee (2021) carried out a study over three months that involved 160 university EFL students. To determine the impact of CALL resources, the students were divided into four groups each one using various multimedia glosses: group A (37 students, only word definition), group B (41 students, word definition plus audio), group C (42 students, word definition plus video), and group D (40 students, word definition plus pictures). The results showed that groups C and D scored substantially higher compared to the other two groups. It was evident that watching videos and photos led students to feel encouraged and inspired to learn unfamiliar terms. Subsequently, they came to the conclusion that studying via multimedia forms (pictures, videos) was more beneficial to children's grades than simple traditional definitions.

**Limitations Found in the Application of the CALL Approach**

The positive effects of CALL appeared in a large number of studies; nonetheless, certain limitations have also been identified. Maftoon et al. (2015) presented a study that attempted to investigate the role of CALL in the vocabulary learning of Iranian intermediate EFL learners. To perform the research study, 68 students from the Simin Language Institute participated. The experimental group used the *VTS Editor* (Virtual Training Suite) software, and a computerized dictionary called *The Longman Exam's Coach English Dictionary*. The data collected showed that the software encouraged students' motivation. However, the learning process was challenging and caused the students to get easily bored at the beginning of the lesson since they were not familiarized with this tool, so the positive findings like increasing motivation only emerged when the students mastered how to use them. Furthermore, research supported by Sedaghatkar (2018) indicated that language learners who have not previously experienced learning with computers may not have a good attitude toward using CALL.

Similarly, a study developed by Bagheri et al. (2012) focused on determining the effectiveness of CALL as an alternative to traditional teaching. Sixty-one Iranian EFL learners were divided into two groups: the control (32 students) and the experimental (29 students). The control group was exposed to realia (paper and flashcards) while the experimental group was involved with a linguistic software called *Phonics*, for 10 weeks. This tool allowed students to learn pronunciation and vocabulary, see the pictures and the spelling of words, and examples in context with the option to check the material whenever they wanted. Despite the different aspects this software provided, Bagheri et al. (2012) stated that the vocabulary was not retained for a long period. For that reason, they suggested that the CALL-based method can be used just as an alternative tool to teach EFL vocabulary, but not as the only one.

## CHAPTER III
## Methodology

This study was conducted as a research synthesis, whose purpose is to create generalizations and identify essential concerns for future investigations by analyzing relevant theories of primary research studies (Cooper & Hedges, 2009). The required data was gathered by using digital databases Google Scholar and Mendeley. The articles for this research synthesis were selected from the following journals: *Broad Research in Artificial Intelligence and Neuroscience (BRAIN), Linguistic English Education and Art (LEEA)* Journal, *Cogent Education, European Online Journal of Natural and Social Sciences, International Journal of Language Education, Hitotsubashi Journal of Arts and Sciences, Journal of Academic and Applied Studies*, *International Journal of Applied Linguistics and English Literature, Education Research International, Studies in Self-Access Learning Journal, Journal of Studies in Learning and Teaching English*, *Theory & Practice in Language Studies, Applied Linguistic Studies*, *Procedia-Social and Behavioral Sciences, International Journal of Research in English Education,* and *Frontiers in Psychology.*

In order to select relevant studies for this research synthesis, we took into consideration the following criteria: In the first place, the studies had to be empirical to obtain information on real students within the EFL context. Second, we considered the sources focusing on the effects of CALL on teaching/learning vocabulary. Third, for the studies to be relevant and updated, a range of 15 years was established, that is, they had to be from 2009 onwards. Fourth, all the articles chosen are in English because the gathered information is aimed at the field of English language teaching. Finally, choosing terms to help us search for relevant studies was also essential. These terms included 1. CALL approach, 2. CALL effects, 3. Vocabulary learning/teaching, 4. EFL, 5. CALL resources.

## CHAPTER IV
## Data Analysis

In order to answer the questions established in this research synthesis, 20 studies were gathered and classified into three different categories for analysis: 1. Number of participants; 2. The effects of CALL on teaching/learning vocabulary; 3. CALL resources used in the studies. The collected data has been arranged in tables followed by a description based on the information obtained from the selected studies.

A general sampling of all the studies, grouped down by age range, is synthesized in Table 1.

**Table 1**

*Demographics Overview: Participant and Age Range*

| Total number of participants | Age range | Average age |
|---|---|---|
| 1,257 | 5-33 | 18 |

Table 1 shows that by adding the number of participants in each of the selected studies, it sums up over one thousand, featuring individuals ranging from younger to adult ages. The number of participants provides a substantial and reliable sample size for generalizing the effects across various contexts, enhancing the credibility of the findings.

As mentioned above, the participants in these studies showed a wide age range, including elementary, secondary, and university students. This diverse age representation helps to ensure that the findings might be applicable to learners of different education levels. This means that the positive effects of the use of CALL are likely to be experienced across all age groups, not just a particular population, particularly regarding vocabulary learning.

**Table 2**

*The Effects of CALL on Vocabulary Acquisition*

| Type of effect | Specific features | Supporting Studies Number |
|---|---|---|
| **Positive** | Increasing autonomy | 6 |
| | Increasing motivation | 13 |
| | Immediate feedback | 3 |
| | Long memory retention | 4 |

| | | |
|---|---|---|
| **Negative** | Short memory retention | 1 |

Table 2 shows a summary of the analysis of 20 studies investigating the efficacy of employing CALL for teaching vocabulary into EFL students. Its purpose is to address the first question of this research synthesis. Just one negative outcome was found. The overwhelming majority of studies (95%) underscored notable positive effects. These included enhanced student autonomy, growing motivation, provision of immediate error feedback, and improved memory retention.

Positive effects are underscored by empirical evidence, which illustrates that individuals who show a demonstrable increase in motivation following the implementation of CALL tools also exhibit simultaneous improvements in their academic evaluations. In most studies, this growth is notably evident in obtaining higher grades in post-tests than those obtained in pre-tests at the beginning of each one of the investigations. Within the compiled data, motivation emerges as the predominant aspect under scrutiny, being mentioned in 13 out of 20 studies. This aspect serves as a critical stimulus for generating higher levels of student engagement, fostering a deeper affinity for the subject, and facilitating a more enriched learning experience.

In the same way, several researchers (Delavari & Pourhosein, 2022; Khoshnoud & Karbalaei, 2015; Lolita et al., 2020; Nejati & Jahangiri, 2018; Sharifi et al., 2015; Hanafiah et al., 2022) have postulated a direct correlation between motivation and the cultivation of greater autonomy within the educational environment. This is due to the integration of understandable and authentic information through various digital and technological instruments, providing students with a multifaceted learning experience. This exposure, facilitated by the flexibility inherent in each CALL resource, transcends the traditional boundaries of the classroom, allowing students to interact with them not only during instructional sessions but also from the comfort of their homes. This flexibility promotes an environment for active and autonomous learning, where students have the power to take ownership of their academic development.

Furthermore, CALL has been remarkable in improving students' cognitive faculties, particularly in the focus of this research synthesis, vocabulary acquisition, and its retention. This is caused by simulating real-world contexts and facilitating the association of words with videos, images, and sounds, allowing students to explore and master unfamiliar terminology. Regarding the programs, they help with the retention and understanding of the sole words or words in a context (readings) taught since they provide immediate feedback for mistakes in pronunciation and spelling. Another important factor to consider is the amount of time spent using each resource. According to Sadeghi and Dousti (2014), increased exposure to

computer-based materials not only enhances vocabulary acquisition but also leads to improvements in students' reading comprehension skills.

In contrast, Bagheri et al. (2012) stated that the time provided for instruction with computer-based activities can be a limitation if teachers do not set it appropriately. As students do not have enough time to review vocabulary in school, a negative effect is poor vocabulary memory retention results, impacting students' development. Another challenge that might be encountered in the CALL process is the inability to use the provided software. Maftoon et al. (2015) and Sedaghatkar (2018) stated that this problem arose from students' lack of familiarity with the technological tools implemented in their classes. This leads to students becoming bored and easily distracted. Despite the increasing integration of computers in education, it was noted that language learners with no prior experience may show reluctance to adopt CALL just at the beginning of the treatment phase.

Overall, the positive impact of CALL on teaching vocabulary to EFL students is well-supported, making it a valuable tool in modern language education. The findings underscore the importance of integrating CALL resources thoughtfully and ensuring that students are well-prepared to use these technologies effectively.

**Table 3**

*CALL Resources Used to Teach Vocabulary and Number of Users/Downloads per Resource*

| **CALL resources** | | **Users/downloads** | **Nº studies** |
|---|---|---|---|
| Websites | Memrise | 65 million users | 1 |
| | Family and Friends 2 | * | 1 |
| | Learn That Word | * | 1 |
| Software | The Longman Exam's Coach English Dictionary | * | 1 |
| | Tell Me More | 7 million users | 2 |
| | 504 Absolutely Essential Words | * | 1 |
| | Narsis | * | 1 |
| | Hot Potatoes | +150 thousand users | 1 |
| | Skype | 36 million users | 1 |

| | | | |
|---|---|---|---|
| | Rosetta Stone | 6 million users | 1 |
| | Phonics | +5 million users | 1 |
| | Mnemosyne | +10 thousand users | 1 |
| | Vocaboly | * | 1 |
| | VTS Editor (Virtual Training Suite) | +250 thousand users | 1 |
| | Learning Vocabulary in Domain | * | 1 |

**This information is currently unavailable.*

Table 3 shows the digital tools that were employed in the studies to facilitate vocabulary acquisition. The resulting list might provide a basis to understand how they support vocabulary instruction as well as which instruments are most frequently used. This compilation might also assist teachers in choosing CALL resources in accordance with their students' needs.

Memrise is the most frequently used website indicated in the aforementioned table. This website allows users to learn vocabulary by using definitions, synonyms, antonyms, and pronunciation of the words. Additionally, users include both students and teachers, who can create their own content to teach vocabulary or just to practice in classes. For that reason, the content of each lesson can be based on teachers' and students' needs (Aminatun & Oktaviani, 2019). Memrise offers a variety of ways for learning new words and according to Memrise (n.d.), 65 million people take advantage of it to learn vocabulary successfully around the world, making it the most widely used tool among the others on the list.

The second most popular tool is Skype. According to Tekios (2023), this well-known software is used by 36 million people around the world. Skype is a useful software to make video or voice calls with a great number of people (up to 100). When using this tool, there is the possibility to record the calls and play subtitles and captions. Skype can be used around the world with whomever you want. Due to its widespread popularity, some studies used this software like Hanafiah's (2022) study, whose positive outcomes indicated an increase in learners' autonomy since students could learn and check the recorded classes whenever and wherever they wanted.

Another valuable CALL resource for teaching vocabulary is The Family and Friends 2 website, published by Oxford University. A key feature of this tool is the *StudentMultiRom*, which includes vocabulary activities designed to reinforce the content presented in the class book. These activities are organized into a beginning phase and six subsequent units, enhancing

the learning experience with engaging images, phonics, stories, songs, and games. Likewise, specific activities used to teach vocabulary within the study were matching words to pictures or a phonics section in which students must choose the correct item for the sound provided. Also, this website provides instant feedback by checking the answers submitted by users and giving responses such as *Congratulations* or *Try Again*, thus facilitating an interactive and supportive learning environment (Sadeghi & Dousti, 2014).

The website Learn That Word facilitates educators and students in arranging and producing content. Similarly, they can practice vocabulary related to the TOEFL exam. It also provides material in which users can find the correct spelling and pronunciation of words. Additionally, photos are added to guess the meaning of vocabulary and statement examples to know how words can be used in context (Kwiliams28, 2019). Moreover, learners obtained a greater degree of autonomy by using this website to learn vocabulary (Khoshnoud & Karbalaei, 2015).

In addition, a further interactive tool created especially for young learners is Phonics. This software offers word pronunciations, visuals, and examples are given in context. The process of correcting errors involves awarding gold stars for correct answers and silver stars for incorrect ones. Additionally, this resource has some vocabulary-learning games, which are essential for keeping students' interest. These features have caught the attention of more than five million users who take advantage of this digital asset (Hooked on phonics Learn & read. n.d.). However, findings reported by Bagheri et al. (2012) showed that students retained vocabulary for a short period. Nevertheless, they mentioned that it might have happened due to insufficient practice.

Maftoon et al. (2015) used the computerized Longman Exam Coach English Dictionary, a source specifically designed to enhance the skills of English language learners. It offers students an easy-to-use platform with a wide variety of interactive modules that seek to improve vocabulary through grammar, reading comprehension, and writing activities emphasizing vocabulary as the basis for acquiring other linguistic skills. In the same way, students can access word pronunciation, whether British or American accent, by simply typing a word or clicking on it. Hence, due to those entertaining activities, the computerized dictionary becomes a useful and attractive tool for students that allows them to practice vocabulary within different contexts without getting bored. Additionally, the dictionary offers detailed feedback on learners' progress, enabling learners to track their performance and identify areas they need to improve.

Learners can also engage in vocabulary exercises using Tell Me More software. The exercises are diverse, which involve word association, filling-in-the-blanks, watching videos and

reflection, among others. However, not just vocabulary can be addressed but also speaking, listening, writing, and grammar exercises (Apponic, 2010) In terms of how useful it was for vocabulary instruction, Naraghizadeh and Barimani (2013) study, as well as that of Enayati and Gilakjani (2020), consistently showed improvements in long-term memory retention.

Likewise, the book 504 Absolutely Essential Words and its software version have proven to be effective tools for vocabulary instruction. As specified by Mousavi and Nemati (2017), the software features words commonly used in everyday conversations, news broadcasts, movies, or songs, ensuring that vocabulary is both relevant and practical. Students can read the words displayed on the software screen while simultaneously listening to their pronunciation. Additionally, the software provides sentences to infer the meaning of each word and includes articles for students to read, thereby enhancing their understanding of the vocabulary within contextual frameworks. This interactive tool allows students to navigate between pages, enabling them to repeatedly listen to word pronunciations as needed, reinforcing in that way their learning experience.

A study conducted by Lolita et al. (2020) focused on the efficacy of Hot Potatoes, a software designed to create pedagogical exercises to improve vocabulary knowledge. The software includes six activity types: filling-in-the-blanks, multiple-choice questions, crossword puzzles, sentence ordering, and association exercises. They are considered easy to access as they can be developed via a website, and efficient since teachers can create different activities quickly without spending too much energy, focusing on a student-centered approach (Trujillo et al., 2015). Furthermore, Lolita et al. (2020) found that students tend to increase their autonomy and motivation when working on these exercises. This enhancement occurs because the exercises enable students to identify and correct their mistakes during their learning process. Consequently, these instruments help motivate students in their learning tasks, helping them assess their existing knowledge and identify areas that might need reinforcement.

In the same way, Narsis is a software that allows students to learn words by watching pictures and listening to audio, sentences, and words. Furthermore, spelling, pronunciation, and translation are included to ensure students can grasp the meanings and know how to pronounce the words correctly (Yunus et al., 2016). Narsis was applied in Delavari and Pourhosein's (2022) study, whose results were encouraging since the pupils increased their autonomy and motivation to learn vocabulary.

In terms of practical resources to enhance fundamental language skills is Rosetta Stone. It is a website and learning software designed to emphasize language production through images,

sound, and text, employing repetition as a key method. The resource is visually engaging and motivates students by offering real-life contexts (Kurniawan et al., 2021). This software was used in research developed by Sharifi et al. (2015). The objective was to increase students' vocabulary knowledge through diverse activities, including tests, games, memorization, readings, and videos. These methods effectively engage students and foster an immersive classroom experience. Additionally, Rosetta Stone features the *TruAccent* speech recognition system, which aids learners in achieving accurate pronunciation. Although Rosetta Stone is not a free resource, it has over 5 million users seeking to improve their language skills. Its popularity is attributed to its online self-directed learning program, which includes self-correcting exercises that provide immediate feedback for each response. This feature enables students to practice frequently outside traditional educational settings.

A useful CALL resource presented in a study by Çakmak et al. (2021) is Mnemosyne. It offers free flashcards to improve the learning process through spaced repetition. Its primary objective is to reinforce long-term vocabulary retention. The tool is easily accessible and customizable, allowing users to add images, sounds, or movie clips, enabling both teachers and students to create personalized flashcards for vocabulary review according to their preferences. Furthermore, this software allows users to set more frequent reviews for more challenging cards that are sometimes quickly forgotten (The Mnemosyne Project, n.d.). Consequently, it captures students' attention and fosters a beneficial learning environment.

Vocaboly is a software whose aim is to teach vocabulary. Within this tool, interactive games appeared to learn and practice new words. Additionally, it offers a test section that focuses on putting into practice what individuals know by tracking their progress (Nejati & Jahangiri, 2018). Through dynamic ways of instruction and easy access to the material, this software benefits English learners by generating strong motivation and increasing their autonomy, expanding their vocabulary considerably (Nejati & Jahangiri, 2018).

According to Maftoon et al. (2015), VTS Editor was initially a simple tool to improve language teaching, particularly vocabulary acquisition by providing detailed information on specific words, including synonyms, antonyms, definitions, and some examples. Over time, this resource has evolved significantly. As a result, nowadays VTS Editor's users have access to various activities such as building dialogues with characters to simulate realistic interactions, designing quizzes, developing games, and implementing a tracking system to guide themselves throughout their learning development. These advanced features allow students to go beyond memorization, encouraging the practice of vocabulary in real-world contexts by enhancing and motivating them in their overall learning experience.

Learning Vocabulary in Domain is a software designed to build up vocabulary on students' knowledge. Students can learn new words by reading statements and guessing the meaning of words in context. Within this platform, users can also learn more about the word, such as its pronunciation and part of speech. Therefore, learners can practice pronouncing these words correctly in a variety of scenarios; for example, a word acting as a noun or verb. Videos and images are also part of it making them more attractive for users. Consequently, this software offers several features that can work well on constructing new vocabulary and for boosting students' enthusiasm (Wu, 2015).

# CHAPTER V
# Conclusions and Recommendations

## Conclusions

The purpose of this research synthesis was to compile the possible effects of CALL on students' vocabulary acquisition as well as the CALL applications used by teachers. For that reason, relevant information was gathered and analyzed to answer these two research questions: a) What are the reported effects of CALL as an approach for teaching vocabulary to EFL students? b) What are the main CALL resources used by instructors while teaching vocabulary to EFL students?

Regarding the first question, the reported effects were categorized as positive and negative. Among the positive findings, the most common effect was the enhancement in students' motivation in more than half of all studies. This was attributed to the dynamic computer-based activities provided to the students, which encouraged and motivated them (Çakmak et al., 2021; Delavari & Pourhosein, 2022; Lolita et al., 2020; Maftoon et al., 2015; Mousavi & Nemati, 2017; Nejati & Jahangiri, 2018; Pahlavanpoorfard & Soori, 2014; Sadeghi & Dousti, 2014; Sedaghatkar, 2018; Sharifi et al., 2015; Shokrpour et al., 2019; Wang & Lee, 2021; Wu, 2015).

In the same way, it was reported that students were able to independently manage their learning activities because CALL tools provide learners immediate feedback, allowing them to correct their mistakes and continue practicing at their own pace and convenience (Delavari & Pourhosein, 2022; Hanafiah et al., 2022; Khoshnoud & Karbalaei, 2015; Lolita et al., 2020; Nejati & Jahangiri, 2018; Sharifi et al., 2015). Consequently, students can analyze their errors and learn from them, continuously improving their vocabulary acquisition while increasing their autonomy (Çakmak et al., 2021; Pahlavanpoorfard & Soori, 2014; Wu, 2015).

Another positive effect is that CALL exhibited long-term memory retention in students' vocabulary. Students retain new words for a long time since they constantly learn with visuals, audios, and activities in context, which help them to foster the acquisition of the language. Long-term memory retention is related to the frequency and amount of time spent learning with these CALL tools (Emami & Amirghasemi, 2022; Enayati & Gilakjani, 2020; Naraghizadeh & Barimani, 2013; Ono, 2017; Sedaghatkar, 2018).

According to the findings, 95% of the studies indicate that employing CALL seems to have a favorable impact on students' vocabulary acquisition. However, Bagheri et al. (2012) found a negative effect while using this approach for vocabulary instruction. They reported that the participants had difficulties remembering new words learned in class and quickly forgot them

after some time. Nevertheless, the researchers suggested that this outcome might have arisen due to insufficient practice (time constraints) or inadequate exposure to the new vocabulary presented. Therefore, this study might be considered an exceptional case, as its findings seem to be based on how the study was conducted rather than on the key features of CALL.

Regarding the second question, the main CALL tools used in the twenty studies were software and websites. On one hand, the use of software stands out, considering The Longman Exam's Coach English Dictionary, Tell Me More, 504 Absolutely Essential Words, Narsis, Hot Potatoes, Skype, Rosetta Stone, Phonics, Mnemosyne, Vocaboly, VTS Editor and Learning Vocabulary in Domain as primary instruments within this research. Each of them, however, features its own sets of exercises and activities focused on vocabulary acquisition. Therefore, the software is to be selected based on the users' preferences. For example, Phonics seems to work better with young learners due to its active and varied features (images, games, etc.), while Rosetta Stone is likely to be more frequently used by older learners looking for readings focused on specific fields of knowledge. On the other hand, three websites focused on vocabulary acquisition were applied in the analyzed studies: Memrise, Family and Friends 2, and Learn That Word. The exercises and activities provided by these websites are somewhat similar to those of the aforementioned software systems. Therefore, it is up to the user to choose the one that best fits their needs or preferences. The positive results from the studies conducted lead us to believe that the above software programs and websites can be effective if properly applied in any class aiming for vocabulary expansion.

To summarize, the integration of computers into educational settings provides significant benefits to students. Digital content fosters motivation and enthusiasm, creating a worthwhile environment for learning. Increased interaction and acceptance of technological tools may indirectly contribute to vocabulary acquisition as students are exposed to a wider range of linguistic resources. Therefore, the use of computer-based activities should be recognized as valuable in the educational landscape as it promotes a positive and stimulating learning experience that supports overall academic development.

**Recommendations**

Based on the analysis of the results, certain recommendations need to be highlighted. First, regarding the effects of this approach, it is suggested to maximize the use of CALL in EFL instruction in general, not only in vocabulary acquisition but also in the four main skills: reading, writing, speaking, and listening, since most effects were positive in this research. However, as Bagheri et al. (2012) expressed, it will cause a higher impact if CALL works as a supplement to other methods. Therefore, teachers should consider adopting this approach if possible.

Likewise, it would be useful to analyze the teachers' perceptions of the use of CALL to clarify different concerns like *Is CALL difficult to use? Is time a barrier? Do teachers spend more time using this?* among others. In this way, we will be more aware of the realities faced by both teachers and pupils, who are the key players in education.

Secondly, since there are a limited number of studies on the use of CALL in Latin America, more research should be carried out in this region. This will allow researchers to compare results with those from other regions and draw valid conclusions about the effects of CALL on vocabulary acquisition in our context.

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