



Pontificia Universidad
Católica del Ecuador | Sede
Ambato

POSTGRADUATE CENTER

TOPIC:

SPACED REPETITION IN THE DEVELOPMENT OF ENGLISH VOCABULARY

**Research project prior to obtaining the title of Magister on English Pedagogy
as a Foreign Language**

Line of research:

INNOVATIVE PEDAGOGIES

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Ambato – Ecuador

September 2025

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SUMMARY

En la investigación se explora la relevancia y repercusión que tiene el aprendizaje del vocabulario en el aprendizaje del inglés y como la Repetición Espaciada puede facilitar dicha labor, teniendo un gran potencial para favorecer la memorización del vocabulario de lenguas extranjeras. Se destaca el aporte significativo que esta técnica posee para mejorar la retención del vocabulario en el idioma.

En este estudio, se contó con la participación de un total de 52 alumnos de dos cursos de primaria. Diecinueve de ellos pertenecían al séptimo año y fueron designados como el grupo de control, mientras que los otros treinta y tres eran alumnos del sexto año y formaron parte del grupo experimental. Se utilizó una metodología de enfoque cuantitativo de tipo cuasiexperimental. Además, se utilizó un cuestionario como herramienta de recopilación de datos en un pre y post test de vocabulario realizado en dos etapas, previas y posteriores a la intervención, la cual se llevó a cabo mediante el uso de la herramienta educativa Quizlet.

Los resultados muestran una mejora en el dominio del vocabulario adquirido durante el proceso de aprendizaje del idioma inglés, tras la aplicación de la técnica de repetición espaciada mediante el uso de la plataforma Quizlet. En el grupo experimental, se observó un incremento del 83%, mientras que en el grupo de control se registró un aumento del 53%, lo cual demostró ser efectivo en el incremento del vocabulario en el proceso de aprendizaje del idioma inglés.

Palabras clave: vocabulario, repetición espaciada, quizlet, aprendizaje, inglés.

ABSTRACT

This research explores the relevance and impact of vocabulary acquisition in English language learning, and how Spaced Repetition can facilitate this process, demonstrating significant potential to enhance the memorization of foreign language vocabulary. The study highlights the substantial contribution of this technique in improving vocabulary retention in English.

A total of 52 primary school students participated in the study. Nineteen of them, from the seventh grade, were assigned to the control group, while the remaining thirty-three, from the sixth grade, comprised the experimental group. A quasi-experimental quantitative research design was employed. A questionnaire was used as a data collection instrument in both a pre-test and post-test vocabulary assessment, conducted before and after the intervention. The intervention involved the use of the educational tool Quizlet.

The results indicate an improvement in vocabulary acquisition during the English language learning process following the application of the spaced repetition technique through the Quizlet platform. The experimental group showed an 83% increase in vocabulary retention, while the control group exhibited a 53% improvement. These findings demonstrate the effectiveness of spaced repetition in enhancing vocabulary acquisition in English language learning.

Keywords: *vocabulary, spaced repetition, quizlet, learning, english.*

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INTRODUCTION

Currently, the learning and mastery of English include an additional language are vital due to its continuous use at a global level in areas as important as educational-academic, scientific, health, technological, diplomatic, tourist activity, the financial world, and of business. For this reason, its teaching has acquired importance from the initial education levels to the university, including the fourth and fifth levels. In this sense, and within the framework of technological innovations characterized by digital platforms available for all the areas mentioned above, learning English is no exception.

As a result, technology plays a crucial role in English instruction and learning across the globe, enabling teachers to modify the dynamics of the classroom and efficiently assist their students' growth during the learning process. Moreover, English (or other languages) in shorter times, improving their skills and using available technological devices, their portability or mobility, network connectivity, and other services provided by technological advances in telecommunications (Nguyen T. , Nguyen, Nguyen, Mai, & Le, 2022).

Since vocabulary entails a productive comprehension of its components, such as the form, meaning, and application of terms, learning vocabulary in a second language (L2) can be difficult for language learners. Finding effective teaching methods or suitable resources is therefore essential for successful and efficient language instruction, particularly for an L2.

One of the advances in the educational technology field has been Quizlet, which was developed with the purpose that students effectively acquire L2 vocabulary without the face-to-face support of a teacher.

It must be emphasized that expanding one's vocabulary is essential to enhancing one's comprehension and knowledge of a second language. Students can now study the vocabulary on their own thanks to the help of Quizlet, which has allowed

them to significantly improve their vocabulary (Ngoc Vu, My Linh, Hong Lien, & Thu Van, 2022).

Quizlet is a digital flashcard platform that helps students create their own flashcards and encourages vocabulary learning (Wright & Cervetti, 2016). This flashcard program is so popular worldwide that it has approximately fifty million users monthly, surpassing the four hundred study sets generated by interested parties (Matthew, 2019). Quizlet stimulates students' interest in experiencing different attractive and friendly studying methods.

To effectively learn English as a second language, Quizlet is used in conjunction with spaced repetition. The German psychologist Hermann Ebbinghaus first advocated spaced repetition as a memory strategy in 1885 (Castillero, 2021). By first recognizing the impact of spaced repetition and publishing it in his book "On Memory" in 1885, this psychologist and philosopher was a pioneer in the experimental research of memory and analysis of higher cognitive capacity. Ebbinghaus developed the forgetting curve, a theory that examined deteriorating memory retention over time, concurrently with his studies on spaced repetition.

"The forgetting curve illustrates how knowledge or information stored in the brain gradually disappears if a person does not make an effort to remember it. (Maroto, 2021, p. 9). The curve indicates that when people genuinely review freshly learnt content, their memory tends to only be cut in half in a matter of days or weeks. The forgetting speed is due to a factor's series, such as the material learned complexity, its meaning, and representation, and physiological elements such as stress and sleep. Two critical methods coexist to overcome the forgetting curve and increase memory strength: mnemonic techniques, where Quizlet comes into play through its flashcards and spaced repetition.

In this sense, spaced repetition, based on active memory, allows reviewing information already learned by separating the learning sessions in time, making the elements easier to remember. It was achieved through a presentation spaced

instead of repeating the study in a short period, known as a massive presentation (Maroto, 2021).

One of the advantages of instruction assisted by multimedia platforms for the learning and mastery of L2 vocabulary is that it allows students to acquire an interest in sustained learning and favors access to information more effectively.

Academic and scientific significance: Because students are not immersed in the target language (L2) environment, incidental vocabulary acquisition is less likely to occur. Consequently, learning vocabulary is an activity that requires time and effort.

CHAPTER I. STATE OF THE ART AND PRACTICE

1.1. Aspects of vocabulary knowledge

When studying vocabulary, students encounter a number of intricate elements, all of which are critical to developing a profound and sophisticated command of the language. Acquiring vocabulary is more than just learning words; it also entails breaking down the various facets of language use and meaning. Three primary areas are the focus of vocabulary exploration: the definitions of words, their application in various contexts, and the intricate web of connections that exist between words. Each of these components must be understood by students in order to build a comprehensive lexical understanding that transcends surface-level learning and enable them to use language responsibly and successfully in a range of contexts (Webb, 2020, pp. 15-16)

The study of word meanings focuses on how words are defined and their complex applications in different linguistic contexts. This includes recognizing different uses of words, their meanings, and how their meanings change over time.

To understand how words are used in context is crucial to comprehending how language functions in real-world scenarios. It discusses how words adhere to grammatical rules, compose phrases and sentences, and accomplish particular communication objectives.

Examine how the relationships between terms are connected through synonyms, antonyms, homonyms and more complex linguistic constructions such as collocations and idiosyncrasies.

Each of these elements significantly contributes to the creation of a diverse and useful vocabulary. Through participation in these characteristics, students can achieve a dynamic linguistic mastery that gives them not only an understanding of specific words, but also the ability to use these words as useful tools of communication and expression.

Word meanings

Polysemy, the phenomenon in which a single term can have multiple related but distinct meanings, is an important component of vocabulary acquisition. Understanding polysemy entails realizing that a word can signify several ideas in various settings, making it challenging for pupils to choose the correct meaning based on their language proficiency.

The connotation of terms, which refers to emotional or cultural connections that go beyond the literal dictionary definitions, is another important concept in the research of term definitions. These connotations can be positive, negative, or neutral, and affect how language is perceived and the communication effectiveness. Knowing connotations helps students to understand the complexities of the language, improving their ability to express nuances. Students consider the registration and appropriateness of the use of words. This involves understanding the social and situational contexts that determine the appropriateness of certain words. This includes recognizing the formality of the language required in different settings, helping students to choose words that fit the tone and expectations of their communication environment (Webb, 2020, pp. 15-24).

Usage in context

Beyond the static meanings of words, learning vocabulary inherently involves understanding how words function within sentences and larger texts. This includes the practical use of vocabulary, where students understand how words are used socially and culturally. The mastery of contextual use is essential to understand idiomatic expressions. Sentences pose unique challenges because they often convey meanings that cannot be directly inferred from individual words. The ability to comprehend and apply proverbs appropriately is a critical skill for achieving fluency since it shows a deeper and more intuitive comprehension of the language.

Contextual understanding also involves recognizing how words modify each other within phrases and how their meanings can change based on their combination with

other words. This skill enhances a learner's ability to both comprehend more complex language structures and use them effectively in their own speech and writing (Webb, 2020, pp. 15-24).

Relationships among words

Learning synonyms enables variation in language usage, preventing repetitive expressions, and studying antonyms enhances comprehension of contrasts. Exploration of word families illuminates derivational morphology, revealing how various word forms nouns, adjectives and verbs are interconnected. Familiarity with collocations words that frequently pair together improves naturalness and fluency in speech. Mastery of these common pairings significantly enhances language proficiency, bringing learners closer to native-like fluency. Understanding semantic networks, where words are interconnected through shared concepts and usage, is particularly beneficial for advanced learners (Webb, 2020, pp. 15-24).

1.2. Levels of vocabulary learning

Research on vocabulary typically focuses on comprehending the connection between a word's shape and meaning. The examination of educational interventions in vocabulary acquisition often involves determining if participants can translate words from their first language (L1) to a second language (L2), identify synonyms, or select accurate translations among multiple choices. Likewise, assessments of vocabulary knowledge typically revolve around verifying learners' comprehension of word meanings. Assessing the understanding of L2 word meanings is vital as it could reflect an individual's ability to comprehend. Nonetheless, concentrating exclusively on the form-meaning relationships may not fully capture the breadth of vocabulary knowledge, which includes various aspects such as derivations and collocations (Webb, 2020, pp. 371-372).

The concept of deep vocabulary knowledge refers to a thorough understanding of a word. Evaluating the depth of vocabulary knowledge should, therefore, reveal how thoroughly learners know words. The need for learners to master several aspects

of word knowledge for efficient communication in reading, writing, speaking, and listening highlights the importance of deep knowledge.

Partial to precise knowledge

This level reflects a learner's journey from an initial, perhaps uncertain grasp of a word to a full and precise understanding. Initially, learners might only recognize a word or associate it with a broad concept or a similar word in their native language. As their knowledge deepens, they begin to understand nuances, including multiple meanings depending on the context and the word's connotations.

Depth of knowledge

Students explore more complex aspects of vocabulary comprehension at this level. This includes understanding the synonyms and antonyms of a term, which expands your lexical options and helps improve your use of the language for greater accuracy in communication. In addition, understanding the collocations of the term and its grammatical relationships with other terms improves students' ability to create more complex and precise sentences. The depth of knowledge also includes recognizing idiomatic expressions and fixed paragraphs that are essential for the natural use of the language, especially in fluent speech and writing.

Receptive to productive use

In language learning, the shift from receptive to productive use is crucial. Understanding words when they are read or heard is known as receptive knowledge, and it is a fundamental skill. Productive use, however, involves actively using these words in speaking and writing. This level is critical for true language mastery, as it requires not only recalling words but also using them spontaneously and appropriately in diverse contexts. The shift is facilitated by regular practice and application in real-life language use, moving vocabulary from passive knowledge to active command.

Processing vs. word learning

Another key feature of teaching vocabulary in English as a second language is the contrast between word processing and word acquisition. First of all, the ability of students to understand and manipulate words in various linguistic contexts is known as processing. Although the acquisition of new words and their incorporation into the student's lexical repertoire are an integral part of learning (Chen, Hung, & Yeh, 2021).

Understanding a word's meaning, grammatical usage, and relationship to other terms in the target language are the foundations of good word processing, which means that it focuses on developing receptive and productive skills to interact with the word in real communication situations. (Myhill, 2021).

On the other hand, word learning is the process of picking up new words via exposure, repetition, and practice. Word learning can occur consciously or unconsciously and can be facilitated by structured activities that encourage attention and retention of new words. The importance of systematic practice and continuous exposure to the variety of words is highlighted (Hulme & Rodd, 2021).

When teaching English as a second language, these methods and techniques offer a thorough framework for teaching vocabulary. They address both intentional and unintentional word acquisition and active vocabulary processing and learning in meaningful contexts and authentic communication (Markus, Kors, & Rijnbeek, 2021).

1.3. Approaches to teaching and learning vocabulary

Incidental vocabulary learning

Incidental vocabulary acquisition is understood as a process in which new words are acquired without having prior knowledge of the students who will be evaluated on the learned words. This type of learning usually occurs together with other

activities, especially those focused on understanding the meaning rather than explicitly studying the vocabulary. Incidental vocabulary learning is contrasted with deliberate learning, which is organized and planned (Webb, 2020, p. 225).

The acquisition of incidental vocabulary is considered to be a result of participating in tasks focused on meaning. For example, when a student reads a text or listens to a conversation not to learn new words but to grasp the content or enjoy the story, vocabulary learning can still occur. This occurs when students find new words and work intuitively to understand them within the context provided by the text or conversation (Webb, 2020, pp. 226-229).

The notion of incidental learning includes a component of intentionality that varies among learners depending on several factors, such as their level of interest or the perceived relevance of the information. This variable intentionality suggests that even when the primary focus is not on learning new words, the attention that learners pay to unfamiliar terms during meaning-focused activities can lead to vocabulary acquisition.

Incidental learning occurs when students encounter new words while reading, listening or participating in conversations, without specific attention to the vocabulary acquisition process, emphasizing the importance of prolonged and meaningful exposure to English for the development of language skills and vocabulary (Jin & Webb, 2020).

Intentional vocabulary learning

Vocabulary learning with intention is characterized by a deliberate focus on vocabulary acquisition through organized and specific activities. This method of learning often involves specific instruction and deliberate efforts of the student to absorb and use new words. In the field of language education, intentional learning is usually put into practice in conditions in which students are aware that their knowledge can be evaluated, which guides them to engage more attentively with the learning material (Webb, 2020, pp. 240-243).

In practical terms, planned vocabulary learning can use a variety of explicit approaches, such as the use of playing cards, participation in connection exercises, or participation in directed practice sessions whose main goal is to acquire new vocabulary. Students actively work to increase their vocabulary bank by focusing on the forms, meanings and use of words in this type of learning (Webb, 2020, pp. 243-245).

Intentional learning facilitates deeper processing of information in addition to the basic vocabulary acquisition process. This can lead to improved retention in the future and make it simpler to retrieve the language for conversation. Students' ability to integrate new terms into their active language abilities is enhanced by the topic's targeted approach, which helps them to draw links between new vocabulary and prior knowledge (Webb, 2020, pp. 243-245).

Intentional learning is based on a clear understanding of the process of word acquisition by the student. This may include activities such as practicing definitions, memorizing words and their meanings. It is common in structured learning environments, where students receive direct instruction on new words and concepts (Siladi & Olena, 2021).

Comparison of intentional and incidental vocabulary learning

Two essential methods in language instruction are intentional learning and unintentional vocabulary acquisition, firstly intentional refers to specific activities designed to teach vocabulary deliberately, while incidental learning involves the acquisition of vocabulary through natural exposure and communication contexts (Siladi & Olena, 2021).

Intentional learning is based on the student's explicit awareness of the word acquisition process, which can include activities such as studying vocabulary lists, practicing definition exercises, and memorizing words and their meanings, being common in structured learning environments, where students receive direct instruction on new words and concepts, on the other hand, incidental learning

occurs naturally when students are exposed to the language in authentic communication contexts (Bergström, Norberg, & Nordlund, 2022).

This comparison highlights the complementary nature of both approaches. While intentional learning provides focused and structured methods to acquire vocabulary, incidental learning offers the advantage of contextual and meaningful exposure, which can enhance the natural assimilation and retention of new words.

1.4. The importance of vocabulary

Vocabulary as the basis for communication

Vocabulary is fundamental for communication, serving as the primary tool for expressing thoughts, feelings, and ideas. It is considered more critical than grammatical structures in facilitating effective communication. According to Dakhi, who cited Sullivan and Alba (2010), " Without grammar, very little can be said; without vocabulary, nothing can be communicated." According to research, language skills including speaking, listening, reading, and writing are all positively correlated with a greater vocabulary, with reading and writing skills showing the strongest association. For a contact to be effective, vocabulary depth and size must be in line with the communication principles of quantity, quality, relevance, and manner. An informative message, truthful speech, appropriate vocabulary, and clear, concise, and orderly use of words are essential for effective communication (Dakhi, 2019).

Vocabulary as the reflection of social reality

There are four main justifications for thinking of language as a social interaction tool: According to Szabo, Stickler, and Adinolfi (2021), The primary functions of language are to: (1) facilitate interaction and communication; (2) reflect its functional and communicative uses; (3) reflect its structure; and (4) include categories of functional and communicative meaning as seen in discourse, in addition to its grammatical and structural features (Szabo, Stickler, & Adinolfi, 2021).

The reality of human cognition is understood through language, which is a system of symbols that express human feelings and thoughts. Only through these symbols, which are linguistic terms selected based on a collection of human social background and emotions during conversation, can reality be seen. This suggests that a person's experiences influence the words they use in communicating. For example, a politician's language is usually linked to social and political issues, and youngsters with limited experiences will have a limited vocabulary to communicate their opinions (Manirakiza & Hakizimana, 2020).

Additionally, vocabulary shapes human reality by influencing how the world is perceived and even how people think, which in turn affects the attitudes and behaviors of listeners. The development of human institutional reality through linguistic representation is stressed in a more philosophical meaning (Manirakiza & Hakizimana, 2020).

Vocabulary as an emotion booster

According to good sense, emotions are a physical phenomenon with little relation to the terms used to name them, considering the terms as simply labels for emotions. But psychological builders argue that language is an essential component of emotions, having a significant impact on how emotions are experienced and perceived (Chen, Hung, & Yeh, 2021).

This viewpoint holds that people's word choices during interactions aid in the creation and perception of emotions that are connected to the particular context in which they are communicating and receiving. In certain situations, language aids in the comprehension and interpretation of physical experiences and the outside world. When sensations are classified using the knowledge of emotion categories, it is suggested that emotions are constructed and that language helps in this process (Chen, Hung, & Yeh, 2021).

Vocabulary as an academic ability predictor

The widespread dissemination of scientific and technological knowledge is often achieved through academic discourse, which is constructed using structured words. This underscores the close relationship between vocabulary and the spread of scientific findings, as research articles are composed of words that play a crucial role in academic discourse. According to linguists, academic discourse usually uses words that are distinct and academic, indicating the specialized nature of this kind of communication (Alfadil, 2020).

Furthermore, academic aptitude is probably predicted by the extent and comprehension of word knowledge. Research approaches and effects may differ, but they all typically confirm vocabulary's value. For instance, research has linked vocabulary to both academic writing and GPA (Grade Point Average). Furthermore, mastering vocabulary is seen to be a prerequisite for improving other language skills (Alfadil, 2020).

The analysis of english vocabulary learning strategies

Vocabulary learning belief

According to one perspective on the English educational system, they are composed of two parts: beliefs and techniques. Students' beliefs about vocabulary learning are fundamental to their behavior. These ideas, which represent the student's attitude toward vocabulary acquisition, have a big impact on the tactics they choose and employ, which aids in managing the learning process and assessing their learning results. Examining students' perceptions of vocabulary learning can help researchers better understand how their method is used. Students generally believe that terms are thoroughly studied and applied, demonstrating their preference for a function-focused English learning strategy (Bouafia & Guerfi, 2020).

This perspective coincides with the opinions of some Western researchers who support vocabulary learning through exhaustive reading instead of automatic

memorization. Because a meaningful context enables more complicated and in-depth processing, studies have demonstrated that vocabulary is easier to learn in contexts than in isolated word lists. It has become easier for the students to memorize new terminology when they use them in writing or in everyday situations because they now understand that active language use is an efficient technique to learn a foreign language. Because of this, they can more easily learn words by active usage rather than memory (Bouafia & Guerfi, 2020).

Overall pattern of english vocabulary learning strategies

There are sixteen characteristics that affect learners' techniques for learning English vocabulary, according to a factor analysis of the items. These components include self-control, planning and execution, selective attention, learner autonomy, reviewing and testing, word creation, memory, association, imagery, grouping, contextualization, dictionary use, note-taking, guessing, affective control, and social activities. According to Zhihong, who referenced O'Malley & Chamot (1986), a well-known taxonomy of learning divides learning approaches into three primary categories: metacognitive strategies, cognitive strategies, and social/affective strategies. Based on the factor analysis, these three groups are additional classifications of the 16 factors (Zhihong, 2018).

Finding the general characteristics of the respondents' vocabulary learning techniques at the metacognitive, cognitive, and social/affective levels is the goal of this investigation. Cognitive and metacognitive tactics are the two most commonly employed of the three categories of vocabulary acquisition techniques. The least common tactics are social and emotive ones (Zhihong, 2018).

Use of met cognitive strategies

Selective attention is a metacognitive strategy in which pupils tend to pay greater attention to words that they believe are used frequently. Teaching strategies that emphasize key words and explore many facets of word knowledge, like multiple

meanings, grammatical elements, and collocations, have an impact on this choice (Charles, 2022).

Regarding metacognitive vocabulary learning strategies, autonomy strategies are observed to be the least employed. Many students rely on vocabulary books for learning and memorization, with fewer engaging with English newspapers or magazines to enhance their vocabulary knowledge. Even fewer students create word cards for review and memorization during their free time, indicating a general lack of autonomy in learning vocabulary. Interviews suggest that some students still view teacher instruction and textbooks as primary sources for English learning, demonstrating a dependence on conventional teaching techniques and a disregard for the significance of learner autonomy (Al-Shumari & Bella , 2014).

Instead of reading materials such as newspapers and magazines in English, it has been found that students mainly learn new words from vocabulary books. This strategy is based on the belief that vocabulary is learned through memorization, reflecting a preference for intentional acquisition rather than incidental acquisition through reading or other sources. The influence of traditional language teaching practices, which emphasize intentional memorization, and the lack of access to English input in learning environments contribute in part to this preference. As a result, learning new words through memorization of vocabulary books is thought to be more efficient (Al-Shumari & Bella , 2014).

Use of cognitive strategies

The most popular methods for learning vocabulary are cognitive ones. Among these, the use of dictionaries is particularly common. Students often consult dictionaries to look up new words for their meanings, phrases, or set expressions associated with the word, and sometimes to confirm or refine their understanding of words they have already learned. This strategy is popular due to its efficiency and immediacy in providing clear usage, expressions, and fixed phrases for new words, as well as example sentences and sometimes even illustrations (Agustín, 2017).

Another cognitive strategy is guessing word meanings. Students commonly guess meanings based on word formation or context, with fewer relying on background information. Students often resort to the assumption to save time because it is impossible to consult a dictionary for every new word they come across while reading. This strategy is especially attractive for independent students who prefer to solve problems on their own rather than working in a team. If the assumption does not give satisfactory results, students can turn to a dictionary to confirm (Andarab, 2017).

Note-taking is also a widely used cognitive strategy. Students often jot down useful expressions, phrases, or additional information related to words they encounter, both in and out of class. This habit, encouraged from an early age, helps students to remember new words more effectively and organize their knowledge systematically. While fewer students take notes outside of class, the practice is still prevalent and is considered beneficial for reinforcing vocabulary learning (Chiva & Fernández, 2022).

The use of social/affective strategies

Fewer students express self-encouragement when their learning outcomes are unsatisfactory, but the majority are able to concentrate on their vocabulary studies. This might be explained by a greater understanding of the value of boosting self-esteem and lowering anxiety while dealing with challenges, which may have been impacted by cultural elements that place an early emphasis on self-control.

Few students, nevertheless, actively seek out chances to utilize recently taught vocabulary, such as by taking part in English corners or conversing with native English speakers. Students generally don't actively seek out chances to practice and expand their vocabulary in English through communication exercises. Instead of working with classmates, native speakers, or others, many people would rather learn alone. These kids frequently exhibit nervousness, which keeps them from using English in public (Zhihong, 2018).

Perspectives in vocabulary learning in second language context

Academic literature frequently discusses the difference between incidental and intentional vocabulary development. In purposeful learning, students use tasks like flashcards, fill-in-the-blanks, and matching exercises that are especially made to help them learn new words. On the other hand, in incidental learning, students acquire vocabulary more casually, through encounters with input focused on meaning (Dang, Lu, & Webb, 2022).

Another important aspect in the research is the difference between studies that focus on word processing rates and those that examine the amount of vocabulary learned. Although word learning has been the subject of numerous studies, some researchers are starting to look at lexical processing utilizing instruments like eye tracking and reaction time tests (Shadiev & Yang, 2020).

Deep and broad knowledge of vocabulary are also key concepts in vocabulary learning research. While depth relates to the extent to which a word is understood in terms of placement, various meanings, and derivations, breadth refers to the quantity of words that are known (Sun & Yin, 2022).

Spatial repetition is a memorization technique that encourages learning by reviewing at time intervals. Various algorithms or theories can be used to implement this technique, including the Ebbinghaus forgetting curve, which suggests the optimal time to review the study material. This method is very helpful for learning a new language since it enables pupils to efficiently review and reinforce vocabulary (Cavaleiro, Martins, Goncalves, & Castelo, 2020).

To sum up, vocabulary acquisition is an essential and intricate part of learning a new language. The combination of intentional and incidental approaches, along with techniques such as spaced repetition, can significantly facilitate the vocabulary acquisition process and improve overall language proficiency (Sok & Han, 2020).

The above-mentioned methodological ideas have given way to new approaches and techniques in linguistics and language teaching methodology over the first seventeen years of the twenty-first century. Among these are those focused on learning in context through extensive reading and listening, explicit instruction, deduction development, and memorization strategies for student interaction. In addition, communicative activities and cognitive organization are applied to lexical learning (Yanagisawa & Webb, 2022).

On the other hand, those associated with a logical-systemic understanding of vocabulary and the development of coherent strategies for learning the lexicon as an alternative to establishing the communicative structure. Sufficient for an adequate understanding of the development of skills such as inference, contextualization, application, and deduction of meanings. Harmonize with the demands of the communicative approach that prevails today (Sari, 2022).

Currently, according to Schmitt and Schmitt (2020), there are multiple theoretical approaches on how to teach vocabulary and how many and what type of activities to program to achieve mastery, among these the teaching of vocabulary through the memorization of definitions has been proposed: the deductive, as an appropriate instrument for the personal and intellectual development of students and the importance of associative plots for the mental organization of vocabulary.

It is believed that vocabulary is a crucial component in learning different language units, in relation to the general linguistic system, it is analyzed as a means rather than as an end in itself, therefore, mastery of vocabulary is crucial, since without it, language learning lacks meaning and functionality, that is, a limited or inadequate vocabulary hinders the ability to understand, memorize and study, ultimately hindering effective communication with others. In this framework, the value of the following statement: ignorance of words corresponds to ignorance of things, where any distinction between ideas and feelings is based on the vocabulary and is fixed in the words (Zou, Huang, & Xie, 2021).

Methodological approaches in teaching vocabulary in English

Different methodological approaches have been applied to teaching vocabulary in English with the aim of maximizing students' ability to learn and remember words, therefore several of the fundamental methodological approaches used in teaching vocabulary in English will be examined, detailing how they are applied in the educational environment (Estrada, Cabada, Bustillos, & Graff, 2020).

Direct Teaching Approach: The direct teaching technique emphasizes the organized and detailed way of introducing new vocabulary, using strategies such as precise descriptions, examples of use in specific circumstances and supervised and autonomous application exercises. This strategy supports the notion that to acquire new vocabulary it is essential to have a continuous education and to perform active activities repeatedly. Teachers play a crucial role in choosing and displaying the right terminology and in continuously assessing students' development (Teng, 2020).

Context-based approach it describes focusing on actions or decisions in the specific situation or environment in which they find themselves, taking into account all the surrounding factors to take appropriate and effective measures.

The foundation of the context-based strategy is the belief that the vocabulary acquisition process is significantly improved in meaningful and genuine circumstances. Teachers use real materials, such as newspaper articles, short stories, and recorded dialogues, to introduce and convey new words to students. As stated by Schmitt in 2000, this method encourages the understanding of the semantics of words when they are used in specific real-life circumstances, which facilitates their memorization and application in various communication contexts (Huang & Liu, 2024).

Focusing on the use of technology as a priority: Several methodological methods that incorporate digital tools have been developed to improve English vocabulary instruction and acquisition as a result of ongoing technological

advancements. Students have the opportunity to practice the enrichment of their vocabulary in a personalized and self-educational way by using mobile applications, digital educational programs and online tools (Ferri, Grifoni, & Guzzo, 2020).

The Mind-Body Based The focus is on the connection between the mind and the body, considering how our emotions and thoughts affect our physical health and well-being.

This strategy, influenced by the concepts of experiential learning theory, considers and values the crucial importance of the interaction between the brain and the body during the learning process and vocabulary development. The use of activities that involve multiple sensations, such as simulation games, theatrical performances and physical exercises, is stimulated with the aim of improving the retention and understanding of words in the vocabulary. The above-mentioned method encourages a comprehensive education that involves both the mental and physical activity of students, resulting in better retention and application of the learned vocabulary (Chiva & Fernández, 2022).

Spaced repetition

Spaced repetition is a memorization technique that favors learning through reviews in spaces of time. These spaces are becoming more extensive as the student memorizes the information. This technique can be implemented by employing different algorithms or theories. The most common is the Ebbinghaus Forgetting Curve Theory, created in 1885 as a basis for estimating the time of review of a particular material (Murre & Chessa, 2023).

A technique for learning vocabulary in the context of mastering a new language is spaced repetition, a technique based on making repetitions of study over time to assimilate certain information. This means that the most appropriate time intervals between study sessions need to be calculated before the information being studied is forgotten (Seibert & Brown, 2020).

Under the criterion of spaced repetition, within the framework of learning an L2, the student can review the unknown words that he has incorporated into his vocabulary during readings made through flashcards, with the aim of learning and reinforcing said words. This dynamic opens the opportunity for programmed learning through spaced repetition that suggests the following review and classifies the words according to their difficulty for the student, using cards. Here, the Quizlet method and programmed repetition can be effectively related through the use of cards, Quizlet's favorite tool (Nguyen T. , Nguyen, Nguyen, Mai, & Le, 2022).

Consequently, the student has the following sessions (functions) to perform their spaced vocabulary repetition in combination with the Quizlet application. In this sense, the Flashcards constitute an activity of memory cards that facilitates conventional learning, in other words, memorizing a word from an L2 with its respective translation into the student's mother tongue. For authors such as Pham, Chen, Nguyen, & Hwang, (2016), the memory card activity is based on the placement of words, numbers, images, etc., either on one or both sides of a series of cards used to study and memorize certain content.

Table 1 presents some studies that, according to the criteria of the author of this research, relate digitally assisted language learning, spaced repetition, and the content of flash cards. This aspect is necessary because Quizlet is fundamentally based on using flashcards for vocabulary learning, allowing this study to relate both methodologies.

In the literature reviewed and related in Table 1, vocabulary acquisition is highlighted as the most critical foundation for learning an L2. The complexity of learning the linguistic sign is the most significant obstacle in learning a language. Therefore, the need to develop systems that facilitate students to link the symbol (signifier) with its meaning is emphasized.

Table 1. Research linking digitally assisted language learning, spaced repetition, and flashcards

N ^o	Reference	Participants	Pedagogical Intervention	Outcome variable	Findings
1	(Sustaita & Borjas, 2018)	N = 8 L1: Spanish (true beginners)	L1: A0 App: Anki Experimental: Anki Control: Anki L2: French Duration: 4 weeks' Time on task: 3.3 hours	Vocabulary Type: French Frequency: high Meaning: recall/Form Recognition: A Review Log was used for students to record the time and number of words studied during the week. The results were used to analyze the differences between the two groups in terms of vocabulary memorization. Test: X-Lex	The mean of the experimental group exceeds that of the control group, but the number of repetitions is double in the control group. The findings of the X-Lex test show that the spaced revision helped the students to better memorize the vocabulary of the 5,000-word dictionary. It is concluded that the results were better in both groups, but there was little difference.
2	(Lotfolahi & Salehi, 2017)	N= 28 Primary school L1: Farsi (Iranian dialect)	App: Magic Time and English Time L2= English Duration: 6 weeks. Per session the 28 students participated in 2 forms of learning: learning in mass and with spaced repetitions.	Learning Vocabulary Type: The study offered an efficient method for vocabulary learning by utilizing retrieval practice techniques and spacing (with corrective feedback) Meaning recall/Form: The number of words accurately recalled in both forms of learning was measured during the 6 weeks of the study.	Compared to those in the enormous condition, participants performed better in the spaced condition.
3	(Naderi & Bagheri, 2017)	N=31 female students L1= Iranian University	App: Felicity and Michael McCarthy's <i>English Vocabulary in Use</i> (Intermediate) L2: English Experimental Group: Two Groups: Class A=16; Class B:	Learning Vocabulary Type: During explicit vocabulary instruction, the experiment examined how spaced repetition affected the acquisition and memory of individual words and collocations.	The scores obtained in the pretest tests administered to the groups, class A and B, were very similar: it is evident that the two groups are Homogeneous. Regarding post-test scores, the results show that the average score of

			15 Duration: 10 sessions + 2 for pre/post tests	Meaning recall/Form: Class A received instruction aimed at learning a single word and another group received instruction aimed at remembering the collocation	the participants increased, showing improvement and efficacy thanks to the experiment for both groups.
4	(Munday, 2016)	N=46 students from level A1 Spanish and 16 from B2 advanced course University L1=English	App: Duolingo L2: Spanish Experimental Groups: Both groups took the language knowledge test when registering for a new course. Freshmen started at zero. Starting levels varied for B2 students. Duration: 4.5 months	Learning Vocabulary Type: Determine if Duolingo can be used as part of a language course, so students can practice anywhere, anytime, in a way tailored to their level and needs, to complement and augment what is covered in class. Meaning recall/Form: Students could use the mobile or desktop version of Duolingo. For both groups, Duolingo accounted for 10% of their final grade. Weekly reports of progress were required.	Regarding the advancement of vocabulary with spaced repetition, through the use of Duolingo, the students of group A1, and group B2, showed improvements.
5	(Okkan & Aydın, 2020)	N=45 second year psychology students L1= Turkish University	App: Quizlet L2=English Duration: 5 weeks	Learning Vocabulary Type: This study looked at how Quizlet affected students' motivation to learn English as a second language (EFL) vocabulary. Test: Background questionnaire and VLMS scale by Ersoy and Boyal (2018) Meaning recall/Form: Weekly reporting of progress	Academic improvements were evidenced in the whole group by learning more vocabulary; the teaching tools triggered their desire to learn vocabulary and they showed an effort to learn more. The vocabulary helped them learn new things even if they were hard to learn and they looked up the meanings of the vocabulary all the time.

6	(Chaikovska & Zbaravska, 2020)	N= Two groups of A2 level EFL students: experimental (n=25), control (n=25) University L1= Ukrainian	App: Quizlet L2=English Duration: 72 hours, 2 periods a week	Learning Vocabulary Type: The intensive EFL course aimed to prepare the students for the state English exam to start a Master course. Test: Two sections: "Reading" and "English usage". Meaning recall/Form: Quizlet tasks included recording translations, selecting images, spelling, picture-based tests, puzzles, matching activities.	The participants' low-intermediate level of English proficiency was shown by the initial diagnosis. The difference between the experimental group's individual scores on the pre- and post-experimental general exams points to a higher level of vocabulary learning success.
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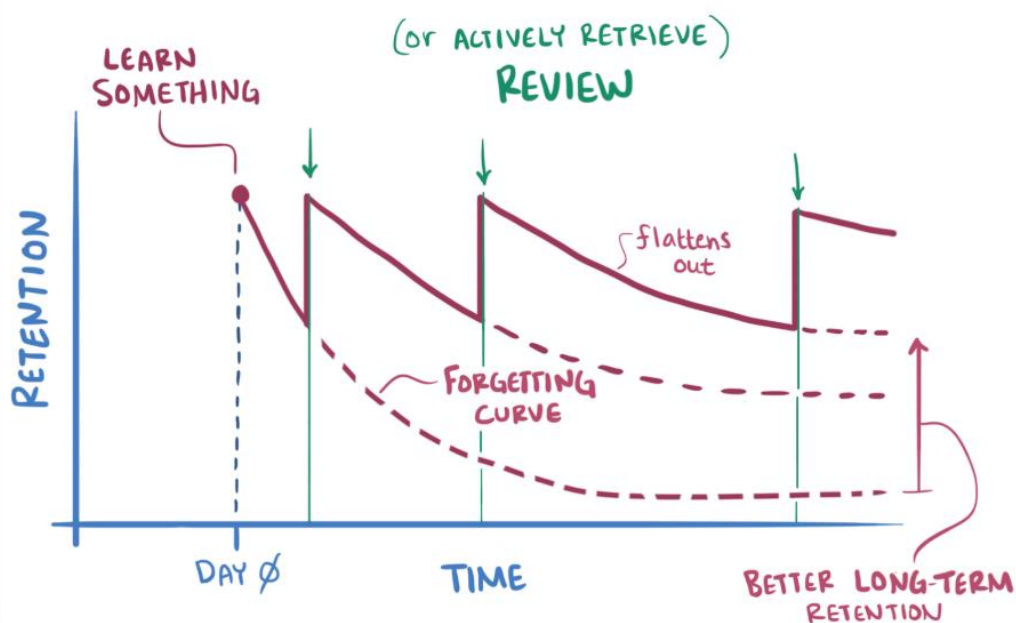
Source: self made

Customizing vocabulary to reflect students' academic interests, combined with the use of technology, has demonstrated effectiveness in facilitating English language learning. Enhanced retention can be achieved by employing methods and strategies such as spaced repetition. This learning approach, increasingly integrated into computer applications, involves short, focused study sessions that typically lead to rapid forgetting. However, it contrasts with the improved long-term memory retention seen when content is reviewed over more extended periods with systematically spaced intervals (Mooney, 2017).

Employing concise information bits, like flashcards or chunks, on a personalized schedule across a span of time aims to prioritize effort on information that is more likely to be forgotten. When learning a new language, spaced repetition involves conducting review sessions over time to internalize specific knowledge, such as English vocabulary. This entails determining optimal intervals between study sessions to reinforce the material before it fades from memory (Schimanke, Ribbers, Mertens, & Vornberger, 2015).

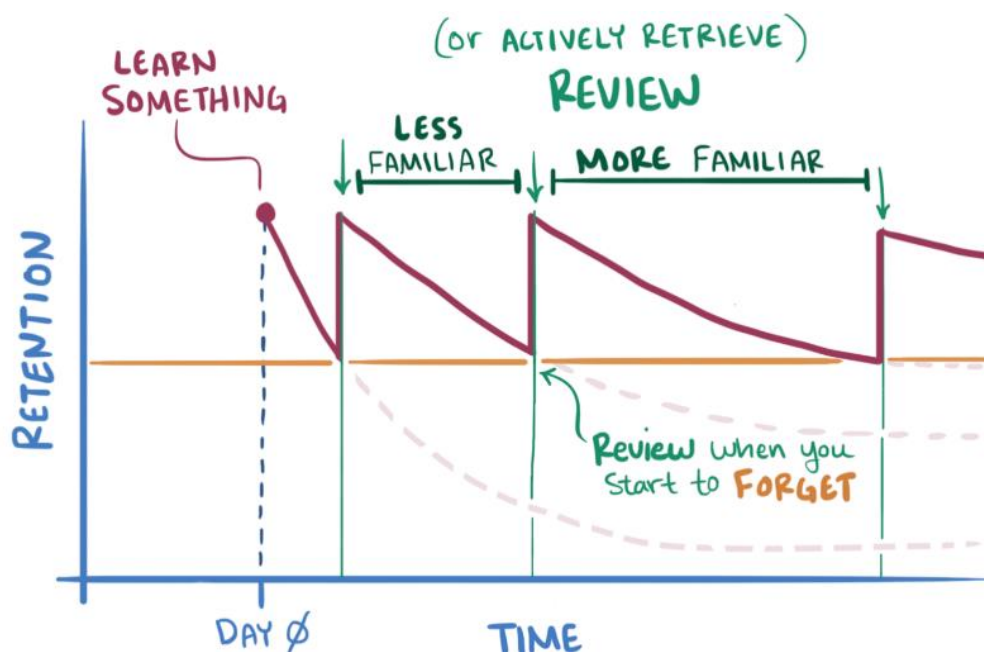
The graphics illustrate the concept of the forgetting curve and how spaced repetition can combat memory loss. When you first learn something, retention is high, but it decreases sharply within the first few days if the material is not reviewed. Figure 1 demonstrates how actively reviewing or retrieving information at specific intervals can flatten the curve, leading to better long-term retention. Figure 2 shows that with each review, especially timed before you're about to forget, the material becomes more familiar, which increases retention over time. These visual representations underscore the effectiveness of spaced repetition in learning.

Figure 1. The forgetting curve



Source: take from The Student Doctor Network (2022)

Figure 2. Retention over time



Source: take from The Student Doctor Network (2022)

Quizlet as an application to study and learn english vocabulary

Consequently, the activities of an App such as Quizlet represent an ideal way for students to enjoy learning new words in the English language, thus increasing vocabulary with the consequent progressive mastery of the L2 (Rezaei & Mai, 2014).

Quizlet was created in 2005 Andrew Sutherland, who, faced with a vocabulary quiz, managed to create a specially formulated tool for learning vocabulary. This tool allows teachers to create pedagogical instruments to facilitate students' learning through digital cards that help them memorize, especially vocabulary. In this context, Quizlet is a free vocabulary-learning website and app that is accessible on iOS and Android. Its primary feature is the administration and development of interactive cards for learning many languages, including French, English, and Spanish, in a fun and varied manner (Anjaniputra & Salsabila, 2018).

The student needs to have a personal or educational Facebook or Google account in order to access the Quizlet platform digitally. This allows them to access Quizlet for free and offers a number of organizational features, like the ability to create

folders to find the card games that the student or teacher has created. Afterwards, the user can create a class for their pupils and invite them to participate by sending them a link. Therefore, the following procedures must be followed in order to construct a set of cards: i) Enter a title that the students will recognize. It might be the subject they will study; ii) describe it; it could be what it will cover, the tasks that need to be completed, or even a bit of pertinent information for the following class. as well as iii). creating the data needed to create the cards, including the front statement or word and the back statement or definition (Nguyen T. T., y otros, 2022).

Modern teaching trends, technological development, and innovation allow teachers to have various online and mobile applications. Therefore, properly implementing ICT in the classroom for learning English as L2 benefits the student body to improve, expand and acquire more vocabulary concerning the desired results. For example, using a digital platform such as Quizlet to use the spaced repetition technique to prepare English learners will favor vocabulary learning (Zeitlin & Sadhak, 2022).

It is essential to highlight that for the author of this research, the advantages of teaching accompanied by digital media stimulate students' interest in meaningful and sustained learning, helping them access information more virtually. Therefore, Quizlet is an online learning service, a multimodal mobile learning application that is based on the Internet and has auditory and visual inputs. It allows students to examine learning materials, providing a novel learning experience in a fun and interactive online context that is unlikely to be found in a traditional offline learning model (Zeitlin & Sadhak, 2022).

Within the framework of today's new challenges and educational paradigms, teachers try to locate the balance between technology and the teaching process. The new generations of students demand the inclusion of attractive, interactive digital teaching materials or resources and the promotion of collaboration and critical thinking. Authors such as Mendoza (2020) emphasize the difficulties educators have in fostering a teaching-learning process that meets the demands of the next generation. In this sense, technology is a valuable resource that supports this

process, but it is necessary to correctly set the objectives to implement technology in the classroom and promote learning.

Teachers can provide instructional materials for the classroom with the aid of open educational resources (OER). In this way, Quizlet is commonly used as a goal to encourage students to learn independently and discover the fun aspects of language classes.

Technology is crucial and fundamental in today's daily life. But for most elementary and secondary school students, their use is mainly recreational or social. In order to empower teachers and students during the teaching-learning process, technological advancements are important. Frequent usage of technology in the classroom inspires students and promotes teamwork and involvement.

Creating materials to acquire and develop an L2 must provide favorable and conducive experiences through attractive illustrations, help learners personalize their learning, develop autonomous and hands-on learning of digital resources, and enable an essential series of learning experiences. However, the current challenge that teachers face is not as simple as it is believed since they have to work with active generations used to technology and play with its playful proposals, as well as to respond automatically when faced with a game dynamic, regardless of the situation or the environment. Therefore, if this has become a constant, it is necessary to include them in academic planning.

The learning currently assisted by digital platforms and applications through mobile devices is characterized by potentially favoring autonomous learning while it is personalized, voluntary, spontaneous, informal, and contemporary. Furthermore, it is essential to highlight that it is reinforced when people have little free time available due to work and especially teleworking in the framework of the COVID-19 pandemic.

In this way, studying English as a foreign language in an academic setting can be facilitated by using a digitally assisted language learning tool like Quizlet. Because

it is made to accommodate independent learners, it can also transform education into a collaborative and dynamic process (Dizon, 2017).

With Quizlet, a computer-assisted teaching tool that uses digital flashcards to help students learn and increase their vocabulary in English, students can share resources and engage digitally in ways that are beyond the scope of resources. Conventional paper cards. Therefore, Quizlet offers a new and entertaining way to learn vocabulary, which can improve students' scores.

An excellent online application and user-friendly website for both teachers and students, Quizlet significantly outperforms paper flashcards, as digital flashcards support students with English learning difficulties and improve their vocabulary significantly more than when they use paper flashcards (Andarab, 2017).

Quizlet's main objective is to promote vocabulary learning through an interactive mode. Learning the lexicon is essential for the understanding and mastery of a language. Even when the vocabulary must be learned in context, using learning cards is an excellent learning strategy. Quizlet is based on the taxonomy of learning strategies proposed by O'Malley in 1985, it separates them into three categories: socio-affective, metacognitive, and cognitive strategies (Mendoza, 2020).

Cognitive strategies contemplate the learning tasks and the materials that favor them; planning, control, and regulation are established in the metacognitive strategies. Finally, the socio-affective ones link the participants' interaction in the learning process.

The metacognitive strategies used by Quizlet represent the self-assessment that allows the student to learn from their mistakes. The cognitive strategies are repetition in various ways, images that allow the word to be related to visual concepts and socio-affective strategies through cooperation between students. Although the learning and use of Quizlet are individual, reinforcing autonomy, it is also strengthened through cooperative strategies.

Quizlet has six activities; one of which is the study cards that can contain words with meaning, word, and translation, word and image, or word and example or can be adapted according to the demands of the student body or the teacher (Mendoza, 2020).

Another dynamic is writing, visually observing the definition or image, and the students must correctly write the word. The third activity is spelling. In this, the students listen to the word; they see the definition or image and have to write the word heard correctly. If it is miswritten, the program corrects the word by spelling it, allowing learning by repetition. In this way, students can self-assess their performance and vocabulary acquisition through a test that can be multiple choice, match columns, and write the word true or false.

The last three activities are playful, two very similar to video games that students play, with competitiveness being one of the main characteristics of the new generations of students. Finally, the last activity framed in socio-affective strategies allows collaboration between students. The teacher thus generates the game and asks the students to enter the electronic portal www.quizlet.live and provides them with the link (code) that the program gives them.

Quizlet facilitates learning through various dynamics. Flashcards offer help with reviewing cards, while the Scatter option engages users in games that match definitions with corresponding concepts, calculating response times (López, 2018). The Speller feature improves listening and pronunciation skills, allowing students to hear and write what they hear. The Test component allows the creation of written evaluations, offering diversity in the evaluation of stored concepts and topics. Furthermore, the Space Race option allows participation in assessments, ensuring effective monitoring of stored topics. Examining the theoretical aspects of Quizlet, Nguyen et al. (2022) detail their characteristic functions, as described in Table 2.

Table 2. Features that characterize Quizlet

Particularities	Features	Mobile App
Learn	Tasks: Flashcard, multiple choice, and writing; customizable by students or teachers.	Available
Flashcards	Create and customize with explanations; on-screen definitions or illustrations.	Available
Spell	Audio-based spelling prompts; feedback and scoring after attempts.	Not Available
Write	Write definitions; feedback after incorrect attempts; limited opportunities to correct.	Available
Test	Various quiz types with customization; progression from text/images to multiple choice.	Available
Match	Game matching keywords with definitions; scoring and ranking after each question.	Available
Gravity	Game linking words to correct definitions while avoiding asteroids; selectable difficulty.	Not Available
Live	Real-time group competition based on teacher-provided vocabulary; team formation.	Not Available

Source: take from Nguyen, et al., (2022).

CHAPTER II. METHODOLOGY DESIGN

2.1. Research design

The approach of this research was quantitative in nature. This approach focuses on phenomena that can be measured and employs statistical techniques for the analysis of collected data. Its primary objective is to describe, explain, predict, and control phenomena through rigorous use of metrics and quantification in data collection, processing, analysis and interpretation of the findings (Sánchez, 2019).

In this sense, the efficacy of spaced repetition applications in the growth of English vocabulary was objectively measured and analyzed using the quantitative approach. A quantitative approach made it easier to gather numerical data, which allowed for statistical analysis and the production of solid and trustworthy results. Since evaluating this technique's efficacy is the primary goal, quantitative approaches were necessary to produce reliable and valid data.

Given the nature of the study and the challenges involved in randomly assigning individuals to the study and control groups, the quasi-experimental research method was used for this investigation. In this case, the goal was to assess how well spatial repetition applications contribute to the growth of English vocabular. Randomly assigning participants to the study and control groups would have been impractical or ethically problematic because it would have deprived one group of the opportunity to benefit from this technique. Therefore, a quasi-experimental design was chosen to allow for a comparison of two groups that were already differentiated in some relevant aspects, such as exposure to spaced repetitions or the absence of them.

2.2. Participants

The research was carried out with the participation of Two groups of kids, ages 11 to 12, who were in the sixth and seventh grades of primary school at the García Educational Unit in Guaranda, Ecuador, participated in the study.

These groups were selected by convenience sampling taking into consideration the availability and accessibility of students at the educational institution.

Experimental group (6th Grade)

The experimental group consisted of a total of 33 students, of which 14 were females and 19 were males. These pupils were enrolled in Unidad Educativa García in the sixth grade of primary school. They were selected to be part of the experimental group due to their willingness and readiness to participate in the study on the effectiveness of spaced repetition applications in the development of English vocabulary.

Sixth graders were chosen as an experimental group based on their English skill level and their ability to understand and use spaced repetition applications. It was also crucial to include a gender-balanced sample to avoid gender discrimination in the results.

Control group (7th Grade)

Nineteen seventh-grade pupils from the García Educational Unit made up the control group. During the study period, these students were not exposed to spaced repetition applications and followed their conventional study method.

In order to provide a comparison group that had not been exposed to the spaced repetition technique, seventh graders were chosen as the control group. This allowed a more accurate assessment of the impact of spatial repetition applications on the experimental group by comparing their progress with the control group.

2.3. Research instruments and techniques

The technique employed to comprehensively assess students' vocabulary acquisition was the written test, and its instrument consisted of a questionnaire that evaluated their knowledge of commonly used verbs in everyday English. This

questionnaire was based on the general program of the test, which stipulated that students were familiar with approximately 30 common verbs used in their daily lives. The questionnaire included a list of these verbs, and students were required to indicate their meaning in Spanish. This instrument was administered to all sixth-grade students before the implementation of spaced repetition applications.

This questionnaire was administered both in the pretest and later in the posttest, after a period during which the students used spaced repetition applications. This method made it possible to measure the effect of these applications on the growth of the students' vocabulary in English with accuracy.

The decision to utilize the same instrument again was motivated by the necessity for a straightforward and trustworthy comparison of the students' progress. Using the same set of verbs and questions in the previous and subsequent exams, variables that could cause confusion are eliminated, and the intervention of spaced repetition applications can contribute to an improvement in vocabulary comprehension. This improves the internal validity of the research and strengthens the conclusions about the effectiveness of these applications.

2.4. Statistical analysis

The effectiveness of the spaced repetition method through the Quizlet platform in enhancing the English vocabulary of sixth and seventh grade students at the García Educational Unit in Guaranda, located in the province of Bolívar, was investigated statistically using statistical software. In the context of this study, multiple fundamental statistical techniques were used with the purpose of analyzing and determining the effectiveness of the intervention applied.

First, both at the start and finish of the intervention, descriptive statistical measures like the average and standard variability were employed to summarize and compare the results between the experimental and control groups. These descriptives provided general information about how the data were distributed and how significant the changes in vocabulary knowledge were between the different groups.

The scores from the initial and final assessments in the experimental and control groups were then compared using the statistical technique known as the Student's t test for independent samples. This analysis made it possible to identify possible important disparities in vocabulary growth between the two groups after carrying out the intervention. The reason the t-test was chosen is because it has the ability to contrast the means of two unrelated data sets, with the purpose of establishing whether the identified disparities are statistically significant.

The effect size was determined using Cohen's d coefficient in addition to the t test. This statistical tool provides data about how large the disparities are in the means of different groups, which makes it possible to understand the practical importance of statistical findings. The capacity of the t-test to ascertain if the use of Quizlet's spaced repetition method has had a discernible impact on the experimental group's improvement in English vocabulary relative to the control group is the reason it is deemed appropriate. In conclusion, the statistical analysis provided a thorough assessment of the intervention's efficacy in enhancing vocabulary in English.

Intervention

Experimental intervention

A test intervention was conducted for the English class students with the central objective of enhancing vocabulary acquisition within a short time frame and assessing the impact of using the Spaced Repetition.

Key aspects of the experimental intervention included:

Use of Quizlet: Students were encouraged to utilize the online platform Quizlet (<https://quizlet.com>) as the primary tool for learning subject-specific vocabulary. Quizlet offers a variety of tools based on spaced repetition techniques to support the learning process.

Type of Vocabulary: The vocabulary addressed on Quizlet focused on words and terms relevant to the English subject. This encompassed verbs, nouns, adjectives, and other key words considered essential for English language proficiency.

Duration and Frequency: The intervention spanned a four-week period. During the first week, students dedicated three sessions of 30 minutes each to Quizlet usage. In the second week, the session duration was reduced to 20 minutes, but the frequency remained at three times a week. In the third week, sessions were reduced to twice a week, with each lasting 20 minutes. Finally, in the fourth week a thirty-minute session was held. This programming was designed with spatial repetition techniques in mind to overcome the forgetting curve and promote vocabulary retention in the future.

Additional Home Usage: In order to practice and solidify their learning outside of the classroom, students were urged to use Quizlet further at home. To help with this, a link to Quizlet flashcard sets was supplied.

Additionally, it is noteworthy that students in the experimental group freely used the offered link for practice at home and indicated a positive assessment of the Quizlet platform. This favorable attitude toward the platform indicates that students are very accepting of and dedicated to their English vocabulary learning process.

Control intervention

In contrast, the control group, consisting of seventh-grade students, did not partake in the experimental intervention and continued to employ their conventional study method for English vocabulary learning over the same four-week period. All students took a post-test using the identical items that were evaluated in the pre-test at the end of the study period. This made it possible to compare the outcomes of the experimental and control groups. Special attention was given to the average number of new words acquired by each group, aiding in determining whether the application of spaced repetitions through Quizlet had facilitated vocabulary expansion among the students.

CHAPTER III. ANALYSIS OF THE RESULTS OF THE INVESTIGATION

3.1. Description of the intervention

The goal of the study was to determine how well sixth and seventh-grade students at the García Educational Unit in Guaranda, Bolívar province, developed their English vocabulary with the use of spaced repetition applied through the Quizlet platform. The primary goal of the intervention was to determine whether using this method may greatly aid in increasing vocabulary in English.

The intervention lasted four weeks and employed a gradual approach on the frequency and duration of the sessions. This was done using spaced repetition techniques to maximize long-term vocabulary retention. The results highlight that this approach proved successful in improving the students' understanding of English vocabulary.

Students participating in the experimental group expressed a positive experience with Quizlet during the intervention period. They enjoyed the platform and voluntarily used the link provided to practice at home. The positive attitude indicates that the students found the site useful and effective in their learning of English vocabulary.

3.2. Statistical results

Statistical analyses were carried out using Jamovi software after the data collection in the study, which sought to ascertain the efficacy of the spaced repetition method through Quizlet in the English vocabulary development of sixth and seventh-grade students at the García Educational Unit in Guaranda, Bolívar province. One of the most important statistical techniques for evaluating the intervention's efficacy was the t-test.

The t-test is often used to compare the means of two groups and ascertain whether there are significant differences between them. The pretest and posttest results for the experimental and control groups were compared in this study using the t-test.

The objective was to determine if the experimental group's students' development of English vocabulary was significantly impacted by the spaced repetition technique intervention in comparison to the control group, which did not receive such an intervention.

Table 3. Descriptive statistics for the pre and post-tests of the experimental and control groups

Group	Test	N	Mean	SD	Mean (%)
Control	Pre	19	2.79	2.04	9%
	Post	19	18.58	7.60	62%
	Gain		15,79	5,56	53%
Experimental	Pre	33	1.24	1.35	4%
	Post	33	26.18	5.40	87%
	Gain		24,94	4,05	83%

Source: self made

Data analysis in table 3 shows that regarding the control and experimental group pre-test values. It can be observed from the nineteen control group participants that the mean is $M=2.79$, representing that from the thirty exercises presented, there were only three correct answers as a max. In comparison, the thirty-three experimental group participants obtained $M=1.19$ in the mean values, representing that from the same thirty questions, they answered correctly only one question from the exercise presented.

Conversely, with respect to the experimental group's and control group's post-test results. The mean for the nineteen members of the control group is $M=18.58$, meaning that, on average, 19 of the thirty exercises that were given had legitimate answers. In contrast, the experimental group's thirty-three participants had mean values of $M=26.18$, meaning that they successfully answered 26 of the identical thirty questions.

Furthermore, these findings demonstrate that there is a 24.94 difference between the experimental group's mean score on the pre-test and post-test. This number indicates an increase in vocabulary knowledge brought about by the Quizlet intervention using the spaced repetition technique.

Likewise, there was a 15.79 improvement between the control group's pre-test and post-test statistical results.

Table 4. Pair sample T-test for the pre and post-tests of control and experimental groups

Group		df	t	p	Effect size
Control	Pre-post	18	10.5	< .001	2.41
Experimental	Pre-post	32	29.3	< .001	5.10

Source: self made

Table 4 shows the control group had an increase in vocabulary learning with the following results $t_{(df=18)} = 10.5$, $p < .001$, Cohen's $d = 2.41$. These values were achieved due to a traditional vocabulary teaching with a list of words. While in the experimental group significantly improved its vocabulary knowledge from the pre-test with this result, $t_{(df=32)} = 29.3$, $p < .001$, Cohen's $d = 5.10$. this increase was achieved by the application of spaced repetition through Quizlet for four weeks, which was distributed as follows: the first week was 3 times for 30 minutes, the second was 3 times for 20 minutes, the third was 2 times a week for 20 minutes and the fourth was once for 30 minutes in class. After evaluating through a vocabulary test, the results showed a greater acquisition of words.

3.3.Discussion of the results

Evaluation of the findings in light of the research questions

According to the study's findings, the experimental intervention—which involved using the Quizlet platform for spaced repetition—had a noticeably bigger effect on the growth of the English vocabulary than the control group. The experimental group's vocabulary comprehension increased by an average of 83%, whereas the control group's increased by an average of 53%.

These findings provide useful information to improve the understanding of this learning strategy. By creating a quasi-experimental study, it was feasible to get a reliable response to the primary query on the efficacy of spaced repetition using Quizlet. This also supported the hypothesis that this methodology can improve English vocabulary development.

In addition, the creation of interactive activities in Quizlet for the development of English vocabulary proves to be a very effective strategy for learning and

maintaining vocabulary. The fact that the students had a favorable attitude toward Quizlet suggests that using digital resources in the classroom can be inspiring and successful. The flexibility provided by Quizlet for practicing at home through the provided link was also well-received by the students.

Analysis of the results in relation to the literature

The study's findings are consistent with those of earlier investigations that evaluated the value of spaced repetition in vocabulary acquisition. The work of Salas and Cárdenas (2021), which concentrated on a bibliographic and documentary investigation of the efficacy and application of the spaced repetition approach in the vocabulary development of English as a foreign language learners, serves as an illustration of this. They discovered that learning may be maximized through repetition, with intervals progressively growing with every study session. In order to encourage sustained retention, he also suggested that the total amount of time intervals between repeats of the same lexical unit should fall within a moderate and wide range.

Similarly, Villarreal Palomeque (2020) demonstrated that students experienced significant improvements in their oral expression (speaking) skills when using the Spaced Repetition Technique in the classroom, with a 91% increase in their performance. This finding indicates that students achieved their learning goals through the application of the Spaced Repetition Technique, underscoring its value as an effective pedagogical approach in the knowledge-building and teaching-learning process.

The theoretical underpinnings of the efficacy of spaced repetition in learning and information retention account for the similarities between the findings of this study and those of earlier investigations. The curved forgetting theory of Ebbinghaus (1885) states that information forgetting occurs over time, but reviewing content at ideal times for long-term retention can stop this process. The theory of human memory mainly focuses on the forgetting curve and the distance effect, which have become two fundamental principles in cognitive science and have served as the

basis for the creation of spaced repetition algorithms, which are widely used. in various educational applications (Palomares Marín, 2021).

In this context, the Quizlet platform becomes an effective tool when applying spaced repetition techniques in the creation of flashcard sets. The repeated and scheduled exposure to English vocabulary allowed students to effectively consolidate their knowledge, which was reflected in a substantial improvement in their post-test scores.

Limitations

It is important to remember that this research has limitations. Regarding the findings, it is crucial to remember that the sample was restricted to pupils from a single school in a particular area, which can limit how broadly the conclusions can be applied to other groups.

In addition, the research focused mainly on receptive vocabulary, which meant assessing the understanding of English words; productive vocabulary is not used directly. This limits a complete understanding of how Spaced Repetition affects all facets of the English vocabulary.

In addition, the study was comparatively short and, although there were significant improvements in the experimental group at that time, a longer duration from the research could provide a deeper understanding of the long-term retention of learned words, aligning with the theory of the forgetting curve.

CONCLUSIONS

- In objective terms, the defined main objectives of the research have been achieved. In this study, the functionality of spaced repetition in English vocabulary development has been determined in detail. It was concluded that spaced repetition is a viable option for carrying out vocabulary learning, especially due to the effectiveness shown in several studies as well as its potential as a digital learning tool Quizlet that correctly plans the exercises for each user.
- On the other hand, the study design executed to carry out the project from the methodological design, it is concluded that Quizlet as a digital tool has brought numerous benefits in meaningful learning, not only in learning the vocabulary of a language such as English but also in learning any subject that is the object of study, as well as the motivation to learn or consolidate knowledge.
- In this sense, the particularity of spaced repetition makes it a feasible strategy in the design of activities by teachers for primary education students, mostly due to the fact that it can be used with desktop computers, smart devices like phones and tablets, and digital apps. In addition, this alternative strengthens the generation of knowledge in the autonomous learning framework where the student is the protagonist of his or her learning.
- Lastly, the literature study conducted throughout the research's development indicates that it's critical to maximize the opportunities offered by the Quizlet software, where teachers can incorporate noises, visuals, and cloze-style activities. This is to make the exercises more attractive and motivating for the students.

RECOMMENDATIONS

- To encourage autonomous learning, teachers should encourage students to use apps and digital platforms like Quizlet to practice their vocabulary at home. Students' active participation in the learning process is the aim. Teachers can also increase the range of Quizlet exercises by adding textual, audio, and visual tasks. This is because the variety of activities can keep students interested and improve retention.
- It is important for teachers to consider adapting spaced repetition activities to different academic levels, both in primary and higher education. Teachers are encouraged to periodically evaluate the effects of spaced repetition on vocabulary learning, monitor student progress, and gather feedback to modify teaching activities and assessments. Activities and approaches can change depending on student needs and abilities.
- Lastly, it's critical to provide teachers with training on how to use digital resources like Quizlet and Spaced Repetition effectively. To make the most of modern technology in the classroom, it is imperative to stay up to date on the best practices. Giving pupils constructive criticism regarding their Spaced Repetition performance is also crucial so they may recognize their advantages and disadvantages.

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ANNEXES

Vocabulary test

Name: _____

Date: _____

Grade: _____

Topic: Verbs

Look at the pictures and read the word in Spanish. Then circle the correct verb.

1. Tomar - coger



- a. Book
- b. Take
- c. Small

2. Hacer



- a. Do
- b. high
- c. Come

3. Tener



- a. fast
- b. have
- c. travel

4. Guardar



- a. is
- b. life
- c. keep

5. Caminar



- a. water
- b. walk
- c. bear

6. Lavar

- a. wash
- b. teeth
- c. law



7. Mirar

- a. boy
- b. watch
- c. leave



8.- Leer

- a. read
- b. shoes
- c. sing



9. Escribir

- a. catch
- b. flower
- c. write



10. Dormir

- a. sleep
- b. stars
- c. pillow





11. Beber

- a. drink
- b. cut
- c. glass



12. Comer

- a. underline
- b. table
- c. eat



13. Jugar

- a. climb
- b. ball
- c. play



14. Trapear

- a. get
- b. broom
- c. mop



15. Barrer

- a. sweep
- b. arrive
- c. start



16. Cocinar

- a. boil
- b. kitchen
- c. cook

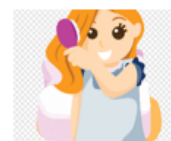


17. Cepillar

- a. paint
- b. dance
- c. brush

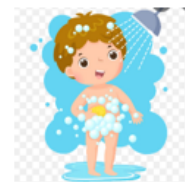
□ 18. Peinar

- a. jump
- b. knees
- c. comb



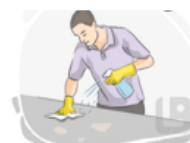
19. Bañar

- a. shower
- b. spoon
- c. run



20. Limpiar

- a. shirt
- b. clean
- c. search



21. Cortar

- a. break
- b. cut
- c. become



22. Pegar

- a. paste
- b. put
- c. fish



23. Pintar

- a. paint
- b. see
- c. speak



24. Dibujar

- a. hate
- b. hit
- c. draw



25. Escuchar

- a. listen
- b. stand
- c. build



26. Pensar

- a. begin
- b. think
- c. grow



27. Chatear

- a. chat
- b. go
- c. stay



28. Levantarse

- a. let
- b. stick
- c. get up



29. Ejercitarse

- a. exercise
- b. spell
- c. hear



30. Abrazar

- a. learn
- b. know
- c. hug



Planning

Objective:

Identify and learn main verbs.

Vocabulary:

Figure 2. xxx

Take	Drink	Cut
Do	Eat	Paste
Have	Play	Paint
Keep	Mop	Draw
Walk	Sweep	Listen
Wash	Cook	Think
Watch	Brush	Chat
Read	Comb	Get up
Write	Shower	Exercise
Sleep	Clean	Hug

Source:xxx

Note: xxx

Warm up

Greeting to everybody.

The first student in the first column says a short phrase in the ear of the next student and so on. When everyone is finished, the last student says aloud what he heard, then the first student does the same, with this you can see that it is not that message.

Presentation

I start by miming about verbs and ask students to guess the words.

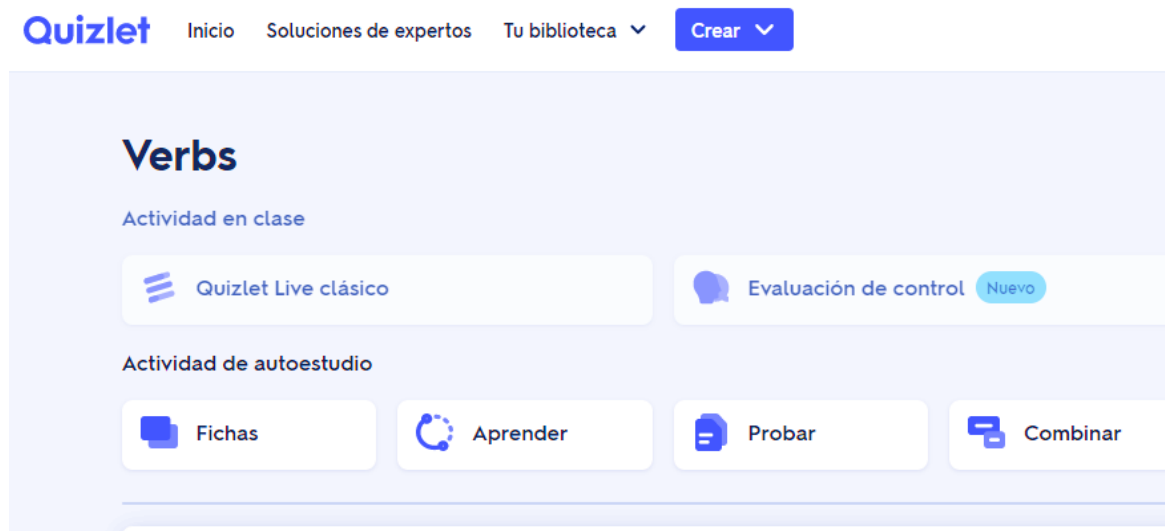
I ask what a verb is and if anyone can say one in English.

I have them listen to a song.

<https://www.youtube.com/watch?v=-ozG4PFFP5A>

Then I present the flashcards of the verbs in Quizlet and we practice writing and pronunciation.

Figure 3. xxx



Source:xxx

Note: xxx

Figure 4. xxx



Source:xxx

Note: xxx

Then I present the flashcards of the verbs in Quizlet, I show the students the image, the writing and at the same time pronounce each verb. Then they can listen to the pronunciation shown on the digital platform.

Practice

Each student is made to participate so that he or she can read each verb.

Then the Quizlet link is shared so they can manipulate and practice in groups.

Production

Work in pairs: one student watches the picture of the verb and the other says it in English.