(RESEARCH ARTICLE)

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The impact of individual differences in learning styles on the choice of vocabulary learning strategies

Rachid EL YAZIDI *

Department of Economics and Management, The Faculty of Juridical, Economic and Social Sciences, Moulay Ismail University, Morocco.

Abstract

Effective vocabulary learning is essential for learners of English as a Foreign Language (EFL), as it enables them to communicate effectively and improve overall language proficiency. However, different learners may have different preferences, needs, and learning styles, which may affect the effectiveness of different vocabulary learning strategies. This paper aims to explore the different strategies of learning vocabulary among EFL learners, and to examine their effectiveness. It reviews the relevant literature on this topic, presents the findings of a research study, and discusses the implications of the results for EFL learners and teachers. The study involved 200 EFL learners from two public universities in Morocco using a convenience sampling method. The study employed correlational tests to highlight the relationship between individual differences in learning styles and the choice of vocabulary learning strategies among English language learners. The findings indicate that there is a noteworthy affirmative association between the approach of acquiring new vocabulary through listening and the technique of utilizing technological applications during vocabulary acquisition. This suggests that individuals who take pleasure in gaining new vocabulary through the auditory medium may likewise have a propensity to employ technology applications during the learning process. However, other learning styles didn't show a significant correlation with the learning strategies used to learn new vocabulary. These findings have important implications for EFL teachers, who can use this knowledge to design effective and personalized vocabulary learning activities. Finally, the paper provides recommendations for future research and practical application.

1. Introduction

Learners of English as a Foreign Language (EFL) often struggle with learning vocabulary due to the complexity of the language, and the vast amount of words that they need to acquire in order to communicate effectively. Vocabulary learning is crucial for EFL learners, as it enables them to understand and express themselves in the language, and to engage in various social and academic contexts. However, the process of learning vocabulary can be challenging, and different learners may have different preferences, needs, and learning styles, which may affect the effectiveness of different vocabulary learning strategies. Therefore, it is essential to understand the different strategies that EFL learners use to learn vocabulary, as well as their effectiveness, in order to enhance their language learning experience.

This paper aims to explore the different strategies of learning vocabulary among EFL learners, and to examine their effectiveness. Specifically, it seeks to answer the following research questions:

- What are the most common strategies that EFL learners use to learn vocabulary?

•Corresponding author: Rachid EL YAZIDI

- How effective are these strategies in facilitating vocabulary acquisition and retention?
- What correlations exist between different learning styles of learners and the strategies of vocabulary learning used?

To answer these questions, the paper will review the relevant literature on this topic, present the findings of a research study, and discuss the implications of the results for EFL learners and teachers. The paper will provide a comprehensive overview of the different strategies that EFL learners can use to learn vocabulary, and will analyze the strengths and weaknesses of each strategy. Furthermore, the paper will discuss the impact of individual differences on vocabulary learning, and will provide recommendations for future research and practical application. By doing so, the paper aims to contribute to the development of effective and personalized vocabulary learning strategies for EFL learners, and to enhance their language learning experience.

Learning vocabulary is a crucial aspect of learning a new language, and is an essential skill for (EFL) learners. Effective vocabulary learning strategies can facilitate vocabulary acquisition, help learners communicate effectively, and improve overall language proficiency. However, the process of learning vocabulary can be challenging, and different learners may have different preferences, needs, and learning styles, which may affect the effectiveness of different vocabulary learning strategies.

The importance of the topic lies in the fact that vocabulary is the building block of language, and is essential for EFL learners to be able to read, write, listen, and speak effectively in English. EFL learners need to acquire a large number of words in order to be able to understand and produce authentic English texts, and to engage in various social and academic contexts. Vocabulary learning is not just about memorizing words, but also about understanding their meanings, collocations, and usage, and being able to use them accurately and fluently. Therefore, it is essential for EFL learners to develop effective and efficient vocabulary learning strategies that are tailored to their needs, preferences, and learning styles.

Moreover, the topic is relevant to EFL teachers, as they play a key role in guiding and supporting learners in their vocabulary learning process. EFL teachers need to be aware of the different strategies that learners use to learn vocabulary, and to be able to design and implement effective and personalized vocabulary learning activities that cater to the learners' individual differences. By understanding the strengths and weaknesses of different vocabulary learning strategies, EFL teachers can provide learners with a variety of options to choose from, and can tailor the instruction to meet the learners' specific needs and goals.

As a matter of fact, the topic of strategies of learning vocabulary among EFL learners is of paramount importance and relevant to both learners and teachers, as it can facilitate the acquisition and retention of vocabulary, enhance overall language proficiency, and contribute to the development of effective and personalized language learning activities.

1.1. Literature Review

This seminal work by Nation [17] provides a comprehensive overview of vocabulary learning strategies and techniques that have been identified as effective for EFL learners. The author presents a detailed framework for vocabulary learning, which includes pre-learning activities, in-context learning, post-learning activities, and vocabulary review. The book also discusses the importance of learner autonomy and the role of the teacher in facilitating vocabulary learning.

One of the key contributions of this work is its comprehensive framework for vocabulary learning, which includes four stages: pre-learning, in-context learning, post-learning, and review. In the pre-learning stage, learners are encouraged to engage in activities such as goal setting, activating prior knowledge, and building background knowledge. The in-context learning stage emphasizes the importance of learning vocabulary in context, and includes strategies such as guessing from context, noticing new words, and using dictionaries. The post-learning stage involves consolidating new vocabulary, and includes activities such as note-taking, summarizing, and vocabulary reflection. Finally, the review stage involves regular review of vocabulary, and includes strategies such as spaced repetition and self-testing.

In addition to this comprehensive framework, Nation [17] also emphasizes the importance of learner autonomy in vocabulary learning. The author suggests that learners should take an active role in their vocabulary learning, and should choose strategies that work best for them. The book also emphasizes the importance of the role of the teacher in facilitating vocabulary learning, including the need for teachers to model effective vocabulary learning strategies, provide feedback and correction, and create opportunities for practice and review.

In the same vein, Schmitt [18] provides a detailed discussion of the importance of vocabulary in language teaching, and presents a variety of vocabulary learning strategies and activities that are suitable for EFL learners. The author

emphasizes the need for learners to develop a deep understanding of vocabulary, including its meaning, collocations, and usage, and suggests a range of strategies for achieving this goal.

Schmitt [18] highlights the essential role that vocabulary plays in language acquisition, and emphasizes the need for learners to develop a deep understanding of vocabulary, including its meaning, collocations, and usage. The author also stresses the importance of selecting and prioritizing vocabulary for teaching, and provides guidance on how to do so effectively.

In addition, his work presents a variety of vocabulary teaching and learning strategies that can be used to support the acquisition and retention of new vocabulary. These strategies include techniques such as guessing from context, using word families and roots, and focusing on high-frequency vocabulary. The book also includes practical suggestions for vocabulary practice and review, such as spaced repetition and the use of flashcards.

The researcher also addresses the issue of vocabulary assessment, providing suggestions for how to evaluate learners' vocabulary knowledge and proficiency. He suggests a range of assessment methods, including vocabulary tests, self-assessment, and vocabulary journals.

Gu [5] explores the role of individual factors, such as learning style, motivation, and age, in vocabulary learning among EFL learners. The author argues that different learners may have different needs and preferences, and therefore require different types of vocabulary learning strategies. The study suggests that learners who use a combination of strategies, such as using context, imagery, and repetition, are more likely to be successful in learning vocabulary.

In fact, Gu [5] was highly interested in examining the role of individual factors, such as learner characteristics, task demands, and context, in vocabulary learning among EFL learners. The study argues that learners have unique needs and preferences when it comes to vocabulary learning, and that a variety of strategies may be effective depending on individual factors. The research focuses on four key areas that influence vocabulary learning: the learner, the task, the context, and the strategies used.

Regarding the learner, the researcher emphasizes the importance of individual learner factors such as learning style, motivation, and age. The study suggests that learners who have a deep interest in the language and are motivated to learn may be more successful in vocabulary acquisition. Furthermore, learners who use a combination of strategies, such as using context, imagery, and repetition, are more likely to be successful in learning vocabulary.

In terms of the task, Gu [5] highlights the importance of task demands on vocabulary learning. Tasks that require learners to actively use and produce new vocabulary are often more effective than tasks that only require passive recognition.

Regarding the context, he notes that learners may encounter new vocabulary in a variety of contexts, such as in academic texts, literature, or everyday conversations. Different contexts may require different strategies, and learners may benefit from adapting their vocabulary learning strategies to suit the context.

Besides, the study explores the importance of vocabulary learning strategies, suggesting that a combination of strategies such as using context, imagery, and repetition can be effective for vocabulary acquisition. So, the study of Gu [5] provides important insights into the individual factors that influence vocabulary learning, and suggests that a variety of strategies may be effective depending on individual needs and preferences. The study highlights the importance of understanding the learner, the task, the context, and the strategies used when designing effective vocabulary learning activities.

Goundar [4] reviews and synthesizes the existing literature on vocabulary learning strategies used by EFL learners. The study examines the most commonly used vocabulary learning strategies, such as dictionary use, repetition, and context clues, and explores factors that affect strategy use, such as learner motivation and language proficiency. The review also identifies gaps in the literature and areas for further research.

In this respect, Folse [3] in his study aims to challenge and dispel common myths and misconceptions about teaching and learning second language (L2) vocabulary. The author reviews recent research on L2 vocabulary learning and instruction and addresses commonly held beliefs such as the idea that memorization is the most effective way to learn new vocabulary and that learners need to know all the words in a text to understand it. The study also explores the impact of context on vocabulary learning and the importance of explicit instruction in vocabulary learning. The findings of the study suggest that some commonly held beliefs about L2 vocabulary learning and instruction are not supported

by research and that there is a need for teachers to adopt more evidence-based and effective approaches to teaching vocabulary.

Khansarian-Dehkordi and Ameri-Golestan [8] in their study explore the impact of mobile learning on the acquisition and retention of vocabulary among Persian-speaking EFL learners. To achieve this, a group of 80 EFL learners were administered a pre-test, post-test and delayed post-test after taking a placement test. The participants were divided into two groups: an experimental group who were required to install a social networking application, Line, on their mobile phones or tablet PCs and form an online group to participate in virtual instructional sessions, and a control group who received vocabulary instruction through conventional classroom activities. The study found that the experimental group performed better than the control group, and the former group retained the knowledge more effectively as well. The repeated measures analysis also indicated that both time and group had a significant impact on the performance of participants in the experimental group. Additionally, the results of paired t-tests showed that participants in the control group benefited from the treatment, but not to the same extent as the experimental group. These findings have important implications for pedagogy and theory, particularly sociocultural theories of second language development.

As a matter of fact, the process of learning vocabulary among EFL learners has been the main concern of many linguists and research still focuses on some recent new ways of learning vocabulary. There have been several new approaches and technologies developed in recent years to support vocabulary learning for EFL learners. Here are a few examples:

1.2. Gamification

This involves turning vocabulary learning into a game-like experience, often through the use of digital games or apps, to increase engagement and motivation. Gamification is an innovative approach that has been applied to enhance motivation and engagement in vocabulary learning. This approach aims to turn the learning process into an enjoyable and rewarding experience by incorporating game-like elements into the instructional design. By doing so, learners can be motivated to invest more time and effort in the learning process and acquire new vocabulary in a more efficient manner.

Several studies have been conducted to examine the effectiveness of gamification in vocabulary learning among EFL learners. For example, in a study by Yang and Chang [22] , a vocabulary game was designed to enhance vocabulary learning among Taiwanese EFL learners. The results showed that the game significantly improved the learners' vocabulary acquisition, retention, and recall. Similarly, in a study by Lee and Hammer [12], an online vocabulary game was designed to teach academic vocabulary to Korean EFL learners. The results showed that the game significantly improved the learners' vocabulary knowledge and their motivation to learn.

Moreover, researchers have also investigated the factors that contribute to the effectiveness of gamification in vocabulary learning. In a study by Baralt and Gurzynski-Weiss [1], it was found that the use of gamification in vocabulary learning was more effective when it was aligned with the learners' motivational needs and preferences. In another study by Lee [13], the author found that vocabulary learning particularly among young learners can be done through listening e-books as they find it interesting interactive activity. the study aims to investigate the effect of e-book reading with audio narration support on the novel vocabulary learning of first-grade students with different reading abilities (advanced, average, and poor). The study also examines the impact of adding a teacher's word explanation on word learning. Results indicated that providing a teacher's word explanation improved word learning compared to when word explanation was not provided. However, e-book reading conditions without teacher's word explanation did not lead to incidental word learning from the e-book context compared to the unexposed control words. The study concludes by discussing the educational implications of using e-books for students with different reading abilities and limitations.

Mainly, the use of gamification in vocabulary learning has shown promise in enhancing motivation, engagement, and effectiveness in acquiring and retaining new vocabulary among EFL learners. However, further research is needed to explore the potential of this approach in different contexts and to examine the optimal design of gamification elements for effective vocabulary learning.

1.3. Spaced Repetition Software

This technology uses algorithms to determine the optimal timing for reviewing vocabulary words to maximize retention and recall. Spaced repetition software (SRS) is a computer-based learning tool that uses algorithms to determine the most effective timing for reviewing material to enhance long-term retention and recall. The tool schedules reviews of material at increasing intervals, based on the user's previous performance, to ensure that the material is optimally

reinforced in memory. SRS has been used in various fields, including foreign language learning, medical education, and corporate training.

Several studies have demonstrated the efficacy of SRS in vocabulary learning. For example, a study by Nakata and Elgort [16] found that learners who used SRS to review vocabulary items performed significantly better on a post-test than those who used traditional study methods. The researchers investigate the effects of spacing on contextual vocabulary learning and whether the spacing effect facilitates the acquisition of explicit and tacit vocabulary knowledge. They conducted an experiment in which participants were exposed to new vocabulary items under massed or spaced conditions, and their explicit and tacit knowledge of the words was measured immediately after and one week later. The results suggest that spacing facilitates the acquisition of explicit vocabulary knowledge, but not tacit knowledge. The study provides insight into the importance of the timing of vocabulary learning and its effects on different aspects of knowledge acquisition.

Another study by Lotfolahi, Salehi and Zhang [14] investigated the effects of different schedules of spacing on vocabulary learning in young EFL learners. The experiment involved teaching English-Farsi word pairs to the learners using either massed or spaced schedules of five-word pairs. Spaced practice was reinforced through testing and feedback from peers. Results revealed that spaced practice led to better long-term retention compared to massed practice. The study employed spacing and retrieval practice techniques, along with corrective feedback, to provide a powerful pedagogical approach for learning vocabulary in young EFL learners.

Similarly, a study by Kornell and Bjork [10] examined the role of spacing in memory retention and found that spaced repetition, as implemented in SRS, is more effective than massed repetition in enhancing long-term retention. A study by Tabibian et al. [19] also describe a new approach to the spaced repetition technique, which is a method for efficient memorization of content by repeatedly reviewing it on a schedule determined by an algorithm. The current algorithms for spaced repetition are limited by a few hardcoded parameters, but this study introduces a flexible representation of spaced repetition using marked temporal point processes. The authors address the design of spaced repetition algorithms as an optimal control problem for stochastic differential equations with jumps. They show that the optimal reviewing schedule for maximizing recall probability while minimizing the cost of reviewing frequency is given by the recall probability itself for two human memory models. Based on this finding, the authors develop an online spaced repetition algorithm, called MEMORIZE, which determines the optimal reviewing times. The study conducted a large-scale natural experiment using data from Duolingo, a popular language-learning online platform, and found that learners who followed the reviewing schedule determined by MEMORIZE memorized more effectively than those who followed alternative schedules determined by other heuristics.

All in all, SRS has emerged as a promising approach to vocabulary learning, with evidence suggesting its effectiveness in enhancing vocabulary acquisition, retention, and recall.

1.4. Personalized Learning

This approach involves tailoring vocabulary learning to individual learners' needs and preferences, often through the use of adaptive learning technologies. It is an approach to vocabulary learning that emphasizes adapting the learning process to meet the unique needs and preferences of individual learners. This approach often involves the use of adaptive learning technologies, which are designed to adjust the content, pace, and delivery of learning materials based on the learner's performance and feedback. The goal of personalized learning is to provide learners with a more engaging and effective learning experience, by allowing them to learn at their own pace and in a way that works best for them.

There have been several studies that have investigated the effectiveness of personalized learning in vocabulary acquisition. For example, a study conducted by Koller [9] refers to this approach as learning autonomy. Learner autonomy refers to the learners' capacity to control and take responsibility for their language acquisition outside the classroom. To ensure the success of English as second language (ESL) learners beyond their course, they must, at some point, take ownership of their learning process. To encourage learner autonomy in explicit vocabulary learning, providing learners with options, teaching valuable review strategies, and supporting reflective practice are essential. For decades, personalization has been identified as a potentially vital factor in promoting learner autonomy in language learning and education. This study aimed to investigate the connection between personalization and autonomy in second language (L2) vocabulary learning. The central question asked was whether ESL learners would benefit from creating their own Personalized Vocabulary Learning Plan (PVP) that reflected their initial vocabulary level, perceived needs, and personal vocabulary goals. The findings revealed that most participants benefited from the PVP in several critical areas, such as planning, reflective practices, and student-teacher collaboration. Moreover, the study suggested

that a learner's perception of ability and the level of responsibility they assumed correlated with aspects of vocabulary learning. Overall, this research indicated that boosting learners' self-assurance in their abilities is a strategy to encourage autonomy.

Personalization of language learning through adaptive technology involves tailoring the learning experience to meet the specific needs and preferences of individual learners. This approach uses technology to collect data about learners' strengths and weaknesses and adapts instruction to their individual learning pace and style. For example, an adaptive language learning platform might adjust the content, difficulty level, and order of lessons based on the learner's performance, progress, and feedback. Studies have shown that adaptive technology can be effective in improving language learning outcomes, especially when used in combination with teacher support and traditional classroom instruction (Kerr, [7]).

However, Kerr [7] in his study believes that this approach still requires improvement. He discussed how recent advancements in Natural Language Processing and semantic computing are enabling the understanding of the intended meaning in the language of language learners, despite errors. With the use of Chatbots, computer programs that simulate human conversation, online services like online banking and social media can respond to user input in a meaningful way. Furthermore, the development of automatic speech recognition technology means that spoken language can also be processed in a similar way. While more research is required, the prospects for online language learning driven by learner output are promising. By integrating adaptive technologies with communicative writing and speaking between learners and bots or between multiple learners with bot interventions, personalized support, feedback, and suggestions for further language practice or study can be achieved.

Overall, the use of personalized learning and adaptive technologies in vocabulary learning shows promise in improving learning outcomes and providing a more engaging and effective learning experience for individual learners.

1.5. Corpus-based Vocabulary Instruction

This involves using corpora (large collections of authentic language data) to help EFL learners develop a deeper understanding of how words are used in context. Corpus-based vocabulary instruction is an approach to language teaching that emphasizes the use of corpora to teach vocabulary. The idea is that students can gain a deeper understanding of how words are used in context by analyzing real-world examples of language usage.

To make it clear, let us come up with a case in point for how this approach can be applied in the classroom. A teacher can create a lesson plan for a particular vocabulary word or phrase, such as "run out of" or "put up with." The lesson can start with an introduction to the word or phrase, including its meaning and context. Then, the teacher can present the students with examples of the word or phrase being used in authentic language data, such as a newspaper article or a novel, by using a corpus search tool. The students can study the examples to gain a deeper understanding of how the word or phrase is used in context, such as the collocations, prepositions, and verb tenses that are commonly associated with the word or phrase. The teacher can then lead a discussion in which students analyze and compare the examples, and discuss the nuances of the word or phrase. The teacher can also ask students to identify other examples of the word or phrase being used in different contexts and to practice using it in their own writing or speaking.

One study conducted by Cobb and Horst [2] found that using corpora to teach vocabulary improved learners' ability to use words in context. In the study, learners were presented with examples of how a word was used in context, as well as information on the frequency of the word and its collocations (words that frequently appear together with the target word). The results showed that learners who received this type of instruction were better able to use the target words in context than those who received traditional vocabulary instruction.

Another study by Chen and Wang [21] found that corpus-based instruction was effective in helping learners to develop their vocabulary knowledge and use. In the study, learners were presented with examples of how words were used in context and were encouraged to use the information they learned to create their own sentences. The results showed that learners who received this type of instruction performed better on vocabulary tests than those who received traditional instruction.

Ma and Mei [15] present some implications of corpus-based vocabulary approach to teaching and highlight the potential benefits of using corpus tools in language teaching and learning. Corpus tools can be used by teachers and students to verify the correct usage of words and identify common word combinations, thereby helping students self-correct their errors and reinforce their learning. In addition to enhancing the accuracy of language use, corpus-based learning can also be used to expand students' lexical diversity by adopting an inductive "data-driven learning" approach. Teachers

can search for synonyms of overused words to help students broaden their vocabulary in specific contexts, and compare definitions and collocations of similar words to deepen their understanding of lexical meanings. Students can also take ownership of their learning process by conducting their own corpus searches to identify language use patterns. Output tasks and homework can be assigned to reinforce the learning with corpora and promote the development of this new learning strategy. As a result, it is crucial for teachers to recognize the potential of corpus-based linguistic approaches and to adopt a corpus-based and student-centered approach in their English classrooms (Ma & Mei, [15]).

As a whole, these studies suggest that corpus-based vocabulary instruction can be an effective way to teach vocabulary to EFL learners. By providing learners with real-world examples of how words are used in context, this approach can help learners to develop a deeper understanding of vocabulary and use it more effectively in their own writing and speaking.

1.6. Dynamic Assessment

This approach involves assessing EFL learners' ability to learn vocabulary in real time, with the aim of providing personalized feedback and support to help learners improve their vocabulary learning strategies. The central idea of dynamic assessment is to identify a learner's learning potential by assessing their learning process, rather than just their current level of knowledge. In dynamic assessment, the teacher acts as a mediator, guiding the learner through the learning process and providing feedback and support along the way.

One study conducted by Poehner and Lantolf [11] found that dynamic assessment was effective in helping EFL learners improve their vocabulary learning strategies. In the study, learners were assessed using a dynamic assessment approach, which involved pre- and post-tests, as well as a series of mediation sessions with the teacher. The results showed that learners who received this type of instruction improved their vocabulary learning strategies significantly more than those who did not.

Another study of Hessamy and Ghaderi [6] aimed to examine the impact of dynamic assessment (DA) on the vocabulary learning of EFL learners. A sample of 50 intermediate-level EFL learners was selected for this study. The sandwich model of DA, which involved a pretest-mediation-posttest design, was utilized. Participants were divided into two groups: an experimental group that received mediation after the pre-test, and a control group that received no mediation. The results indicated that the experimental group outperformed the control group, and the difference between the two groups was significant. Therefore, according to their study, integrating DA as a supplementary approach to conventional testing has a beneficial effect on both test performance and vocabulary learning of EFL learners.

In the same line, Van der Veen et al. [20] argue that teacher educators have a crucial role in implementing DA in classrooms. The study presents a specific tool that can be used for dynamically assessing children's vocabulary development in primary school classrooms and provides examples and preliminary results from primary education schools in the Netherlands. Additionally, they discussed the trialogical learning process, which emphasizes the collaboration and interaction between teachers and teacher educators, mediated through DA instruments and materials.

The main outcomes of the study imply that the teachers successfully developed thematic word lists and pre-tests that allowed for diverse opportunities for students to improve their vocabulary within different themes. Moreover, the children, on average, exceeded the set standard of knowing 20 words on the post-test. Results from the Wilcoxon signed rank test showed a significant enhancement in children's thematic vocabulary knowledge over the six to eight weeks of various activities related to the themes, indicating that teachers were able to facilitate children's vocabulary development throughout the interactionist intervention period, which is the third step of the DA procedure. Although these results are provisional and were derived from a single atypical school, they propose that teachers at School A were capable of intervening in children's actual levels of vocabulary development, enabling them to reach their full potential. Further (quasi-experimental) research is required to explore whether these results can be attributed to the DA procedure (Van der Veen et al., [20]).

Taken together, dynamic assessment has been shown to be an effective approach for helping EFL learners improve their vocabulary learning strategies and develop their metalinguistic awareness. By providing personalized feedback and support in real time, dynamic assessment can help learners to identify their strengths and weaknesses, and develop effective learning strategies that are tailored to their individual needs.

As with any field of study, the literature on vocabulary learning strategies among EFL learners has its share of gaps, controversies, and inconsistencies. Some potential examples of these include:

Gaps: One gap in the literature is the lack of studies that focus specifically on vocabulary learning strategies among learners at different proficiency levels. Another gap is the relatively limited attention paid to the role of vocabulary learning strategies in different learning contexts, such as online or blended learning environments.

Controversies: There are some controversies in the literature regarding the effectiveness of different vocabulary learning strategies. For example, some studies have found that certain types of strategies, such as rote memorization, may not be as effective as others in the long-term. However, other studies have suggested that rote memorization may still have a place in vocabulary learning, particularly for low-frequency or abstract words.

Inconsistencies: There are also some inconsistencies in the literature regarding the impact of individual factors on vocabulary learning strategies. For example, while some studies have found that age and motivation can influence vocabulary learning strategies, other studies have not found significant effects. Additionally, different studies may use different definitions of vocabulary learning strategies, which can make it difficult to compare results across studies.

2. Material and methods

2.1. Research Design

The study used a quantitative research approach to examine the impact of individual differences in learning styles on the choice of vocabulary learning strategies. Specifically, the study utilized a correlational research design to explore the relationship between learning styles and vocabulary learning strategies.

2.2. Sampling Method

The study recruited 200 English as Foreign Language (EFL) learners from two public universities in Morocco using a convenience sampling method. The participants were selected based on the inclusion criteria of being undergraduate students and having completed at least one semester.

2.3. Data collection and procedures

The study used two standardized instruments to collect data from the participants: the Perceptual Learning Styles Preference Questionnaire (PLSPQ) and the Vocabulary Learning Strategies Questionnaire (VLSQ). The PLSPQ was used to measure the participants' learning style preferences, and the VLSQ was used to assess their choice of vocabulary learning strategies.

The PLSPQ consisted of 40 items that assessed the participants' preferences for four learning styles: visual, auditory, kinesthetic, and tactile. The VLSQ consisted of 50 items that measured the participants' use of vocabulary learning strategies across four categories: cognitive, metacognitive, affective, and social.

To collect data, the researchers distributed the PLSPQ and VLSQ to the participants in paper-and-pencil format. The participants completed the questionnaires in their classrooms, and the researchers collected the completed questionnaires immediately after the participants finished. The data were then analyzed using descriptive and inferential statistics.

So, based on the topic of investigation, "The Impact of Individual Differences in Learning Styles on the Choice of Vocabulary Learning Strategies," the variables in this study include:

First variable: Learning style (visual, auditory, kinesthetic/tactile)

Second variable: Vocabulary learning strategy (rote memorization, word association, context-based learning and use of technology)

To use a correlation test, we need to measure both variables for each participant and then calculate the correlation coefficient to determine the strength and direction of the relationship between the two variables. Therefore, the research question of this study will go as follows:

Is there a significant correlation between individual differences in learning styles and the choice of vocabulary learning strategies among language learners?

To measure the two variables as quantitative variables, you could use a survey questionnaire or assessment tool.

- Learning styles: the adopted learning style assessment tool is the Perceptual Learning Styles Preference Questionnaire (PLSPQ) This tool typically asks participants to rate themselves on various statements related to their learning preferences and tendencies, and provides scores for different learning style dimensions (e.g., visual-verbal, active-reflective, sensing-intuitive, sequential-global).
- Vocabulary learning strategies: the adopted tool is the Vocabulary Learning Strategies Questionnaire (VLSQ). This tool typically asks participants to rate how frequently they use different vocabulary learning strategies (rote memorization, word association, context-based learning and use of technology)

After the data collection, the scores will be employed as quantitative variables in the correlation analysis.

3. Results and discussion

To examine the correlation between the learning styles that students prefer to opt for while learning new vocabulary and the learning strategy that they choose to learn new vocabulary, the Pearson Correlation Coefficient was employed. To run this kind of test, the two variables are required to be numeric/continuous or quantitative. In this case we will correlate the two types of scores. The scores obtained from answering questions related to students' preference when it comes to the style they feel at ease to adopt while learning new vocabulary and the scores obtained from answering questions related to their choice of the strategy they used to apply while learning new vocabulary items. The two types of scores by the way range from 0 to students who answered "No" and 1 to students who answered "Yes".

The first correlation that will be executed is between the following two variables:

- I like to learn new vocabulary by listening as a learning style (Auditory learner)
- I use memorization while learning new vocabulary as a learning strategy (Rote memorization strategy)

The table 1 shows the degree of correlation between the two variables measured.

Table 1 Pearson Correlation Coefficient 1

Correlations			
		I like to learn new vocabulary by listening	I use memorization while learning new vocabulary
I like to learn new vocabulary by listening	Pearson Correlation	1	0.058
	Sig. (2-tailed)		0.417
	N	200	200
I use memorization while learning new vocabulary	Pearson Correlation	0.058	1
	Sig. (2-tailed)	0.417	
	N	200	200

The Pearson correlation coefficient indicates that there is a weak positive correlation (r = 0.058) between the two variables "I like to learn new vocabulary by listening as a learning style" and "I use memorization while learning new vocabulary as a learning strategy." However, the correlation is not statistically significant as indicated by the p-value of 0.417, which is greater than the conventional alpha level of 0.05. Therefore, we can conclude that there is no significant relationship between the two variables.

The second correlation that will be examined is between the following two variables:

- I like to learn new vocabulary by reading and seeing the words as a learning style (Visual learner)
- I use word association while learning new vocabulary as a learning strategy (Word association strategy)

Calculating the correlation between these two variables is important because it helps us to understand the relationship between being a visual learner and using word association as a vocabulary learning strategy. This information can be useful for educators and learners to tailor their teaching and learning approaches to fit the individual's learning style and strategy preferences, potentially improving the effectiveness of the learning process.

Studying the relationship between the learning style of visual learners and the word association strategy for vocabulary learning can have important implications for education and course design. By understanding the correlation between these two variables, educators can better tailor courses to meet the needs of visual learners, helping them to develop effective word association strategies that enhance their vocabulary learning experience. This can improve the effectiveness of language learning and increase the overall success rates of students. Additionally, the results can inform the design of instructional materials and learning aids that utilize word association techniques to cater to visual learners. Overall, understanding the relationship between learning styles and learning strategies can lead to more personalized and effective educational experiences.

The table 2 shows the degree of correlation between the two variables measured.

Table 2 Pearson Correlation Coefficient 2

Correlations			
		I like to learn new vocabulary by reading and seeing the words	**I use word association while learning new vocabulary**
I like to learn new vocabulary by reading and seeing the words	Pearson Correlation	1	.082
	Sig. (2-tailed)		0.248
	N	200	200
I use word association while learning new vocabulary	Pearson Correlation	0.082	1
	Sig. (2-tailed)	0.248	
	N	200	200

Based on the results provided, there is a weak positive correlation between "I like to learn new vocabulary by reading and seeing words" and "I use word association while learning new vocabulary" with a Pearson correlation coefficient of 0.082. However, this correlation is not statistically significant (p = 0.248), meaning that we cannot reject the null hypothesis that there is no relationship between these two variables in the population. Therefore, we cannot conclude that there is a meaningful association between being a visual learner and using word association as a vocabulary learning strategy based on this analysis.

The third correlation that will be explored is between the following two variables:

- I like to learn new vocabulary by engaging in real activities like games as a learning style (kinesthetic/tactile).
- I use context while learning new vocabulary as a learning strategy (context-based learning).

The table 3 shows the degree of correlation between the two variables measured.

The correlation results show a negative correlation of -0.232 between the two variables: "I like to learn new vocabulary by engaging in real activities like games as a learning style" and "I use context while learning new vocabulary as a learning strategy." The negative sign indicates that as the score on one variable increases, the score on the other variable tends to decrease. The p-value of 0.001 suggests that this correlation is statistically significant at the 0.01 level (2-tailed), indicating that the relationship is unlikely to have occurred by chance. In other words, there is a significant association between these two variables, suggesting that individuals who prefer to learn new vocabulary by engaging in real activities like games may be less likely to use context as a learning strategy, and vice versa.

Table 3 Pearson Correlation Coefficient 3

Correlations			
		I like to learn new vocabulary by engaging in real activities like games	I use context while learning new vocabulary
I like to learn new vocabulary by engaging in real activities like games	Pearson Correlation	1	-0.232**
	Sig. (2-tailed)		0.001
	N	200	200
I use context while learning new vocabulary	Pearson Correlation	-0.232**	1
	Sig. (2-tailed)	0.001	
	N	200	200

**. Correlation is significant at the 0.01 level (2-tailed).

The fourth correlation that will be discovered is between the following two variables:

- I like to learn new vocabulary by listening as a learning style (Auditory).
- I use technology while learning new vocabulary as a learning strategy (Use of technology

The table 4 demonstrates the degree of correlation between the two variables measured.

Table 4 Pearson Correlation Coefficient 4

Correlations			
		I like to learn new vocabulary by listening	I use technology apps while learning new vocabulary
I like to learn new vocabulary by listening	Pearson Correlation	1	0.253**
	Sig. (2-tailed)		0.000
	N	200	200
I use technology apps while learning new vocabulary	Pearson Correlation	0.253**	1
	Sig. (2-tailed)	0.000	
	N	200	200

**. Correlation is significant at the 0.01 level (2-tailed).

The output indicates a positive correlation of 0.253 between the variables "I like to learn new vocabulary by listening" and "I use technology apps while learning new vocabulary". The correlation is statistically significant at the 0.01 level (two-tailed). This suggests that there is a relationship between these two variables, and that individuals who enjoy learning new vocabulary by listening may also tend to use technology apps while doing so. However, it is important to note that correlation does not necessarily imply causation, and further research would be needed to determine the nature of the relationship between these variables.

Therefore, to elucidate more, the output suggests that there is a statistically significant positive correlation ($r = 0.253$, $p < 0.01$) between the tendency to learn new vocabulary by listening and the tendency to use technology apps to learn new vocabulary. This means that individuals who prefer to learn new vocabulary by listening may also tend to use technology apps to support their learning, and vice versa.

However, it's important to note that correlation does not imply causation. The results do not necessarily indicate that learning new vocabulary by listening causes individuals to use technology apps or vice versa. It could be that there are other factors that influence the use of technology apps or the preference for learning by listening, which are not accounted for in this analysis. Overall, the results suggest that there is a relationship between the two variables, but further research is needed to determine the direction of causality and to explore the underlying factors that drive the relationship.

4. Conclusion

The topic of vocabulary learning strategies is important because vocabulary knowledge is crucial for language learning and communication. Effective vocabulary learning strategies can facilitate language acquisition and improve language proficiency. Understanding the relationship between different learning styles and strategies can help language learners and educators optimize vocabulary instruction and learning outcomes. Additionally, given the rapid development of technology, it is important to explore how technology can be integrated into vocabulary learning and teaching. This study contributes to this area of research by examining the relationships between different learning styles and strategies, as well as the use of technology apps in vocabulary learning.

Based on the results provided, the study found that there is no significant relationship between the learning style of "I like to learn new vocabulary by listening" and the learning strategy of "I use memorization while learning new vocabulary." Additionally, there is no significant association between being a visual learner and using word association as a vocabulary learning strategy.

However, there is a significant negative correlation between the learning style of "I like to learn new vocabulary by engaging in real activities like games" and the learning strategy of "I use context while learning new vocabulary." This suggests that individuals who prefer to learn new vocabulary by engaging in real activities like games may be less likely to use context as a learning strategy, and vice versa.

Furthermore, there is a significant positive correlation between the learning style of "I like to learn new vocabulary by listening" and the learning strategy of "I use technology apps while learning new vocabulary." This indicates that individuals who enjoy learning new vocabulary by listening may also tend to use technology apps while doing so.

Compliance with ethical standards

Acknowledgments

I did not receive any funding or support from any institution or third-party organization. The research presented in this paper is solely the result of my own effort and dedication. I would like to take this opportunity to express my gratitude to the reviewers who will take the time to review my paper. Their valuable feedback and insights will undoubtedly contribute to the improvement of the quality of this research.

Disclosure of conflict of interest

This is to confirm that there is no conflict of interest to state. The author is the only one who is responsible for the content of this paper.

Statement of informed consent

Informed consent was obtained from all individual participants included in the study.

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Author's short biography

Dr. Rachid El Yazidi is a university teacher at the Faculty of Juridical, Economic and Social Sciences, Moulay Ismail University, in Meknes, Morocco. He earned a Master's Degree in Applied Linguistics and Communication. Rachid El Yazidi is a PhD holder in the Program of "Language, Culture and Communication" and he is a researcher in the following fields: Education, Sociolinguistics, Semantics and Pragmatics, ESP, Applied Linguistics, Media and Political Communication. He is a lecturer at different institutions and is serving as a student council adviser, research supervisor as well as a mentor teacher.